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OUR FORERUNNERS

A STUDY OF PALÆLITHIC MAN'S CIVILISATIONS IN WESTERN EUROPE AND THE MEDITERRANEAN BASIN

BY

M. C. BURKITT, M.A., F.S.A.

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PREFACE

THIS volume is the outcome of a desire to bring the serious study of a fascinating and enthralling subject within the reach of those who do not care to buy expensive books. Naturally every fact and detail, and exception to rule, cannot be included in the compass of such a small work, but I hope to lay down the main outlines. For further study larger works will have to be consulted.

My very best thanks are due to Miss Mary Boyle, who has acted as secretary — by no means a merely mechanical work.

Mr. Stanley has undertaken to prepare the illustrations. It must be realised that illustrations on ordinary paper cannot show every line (*e.g.*, every hair of a Mammoth's coat) in the original drawings by the Palæolithic artist. But nothing of importance has been omitted, and the general aspect is the same. A very generalised map is included for the convenience of the reader.

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My grateful thanks are also tendered to Dr. Haddon for his offer to read the proofs, an offer which I gladly accepted; also to Miss Parry, who has greatly helped in correcting and proof reading.

I have also to thank the Abbé Breuil for his permission to reproduce any of his published illustrations. All the art reproductions are after Breuil, with the exception of figure 7, and even here the "Sceptre" or perforated bone staff and the "Reindeer herd" are after Breuil, but the "Ibex spear-thrower" is after Piette.

The Bison's head of the frontispiece comes from Aguas de Novales, a cave not far from Altamira.

Cambridge, Feb., 1923.

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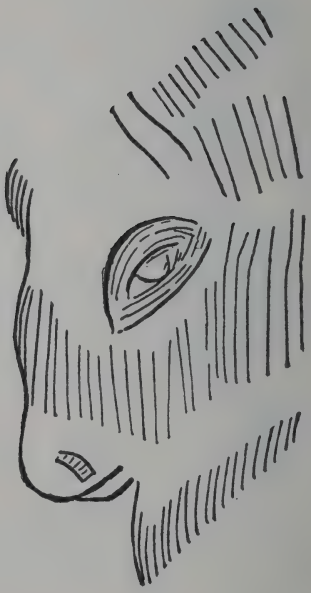

OUR FORERUNNERS

CHAPTER I

INTRODUCTION

As the title shows, this little book is intended as a preliminary study of the Life and Times of peoples living in a dim and remote past. Only fragments of the earliest histories of mankind can as yet be deciphered, and as the majority of actual remains discovered have been found in Western Europe and North Africa, the only peoples who can be treated of are those in the Mediterranean Basin and in Western Europe.

Our knowledge of the life of Man in comparatively recent times is obtained from a study of written documents, by comparison of which reasonably accurate history can be deduced, so that to-day we know the sequence of events in Western Europe for nearly three thousand years. There was, however, a time when Man existed but had not yet invented writing as a means of recording his impressions and the events occurring around

him. It is the earlier part of this period that we are going to study.

Our subject is sometimes called "Prehistory," a condensed word meaning the "History of the times before History was written," and the range of our subject will be the Life, Surroundings, and Civilisations of the peoples in Western Europe and North Africa before the times when consecutive history can be derived from written documents.

Our starting-point is the time when Mankind emerged from what may be called the animal state. Of the thorny problems of the evolution of Man we shall not treat, they are outside the scope of the present volume. As we learn more about the life of the most primitive examples of Man it will be found that it is impossible to fix a date for the birthday of the prehistoric era, even as concerns the small part of the world with which we have to deal, for it is only here and there that investigation has been carried out. The beginnings are lost in the mists of antiquity awaiting some explorer to rediscover the wonders of the early days. However, as so little is known as yet of the earliest races of Man, we are not greatly concerned about an exact earliest date.

It has been suggested by a modern writer that one of the greatest moments of progress came when the creature, with its comparatively weak defence against enemies, left the partial shelter of the trees (conjectured to be getting sparse owing to changes of climate), and, braving a multitude of foes, took to the ground whence it could more easily obtain its food. This change is assisted by an erect attitude, and a long specialised hand. It is difficult to say in what region of the world such a change first took place, but something of the sort would seem to be not far removed from the truth.

While Mankind was learning to walk firmly upon the ground on two legs and slowly developing his brain, there must have been many intermediate stages when it would have been difficult to say whether the creature should be described as a highly developed animal or a low type of Man.

What criteria are we to take? The use of Fire? Certain anthropoids have been known to sit round and enjoy a fire once started.[1]

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[1] The writer has been assured of this as a fact, and dwellers in equatorial Africa, even though they may not personally have seen the action, express no surprise at the idea.

A tool maker? Yet who is to say that a highly developed animal could not adapt stones to suit his purpose? Monkeys have been known to pick cocoanuts and stones and use them as missiles, and the adaptation of local material to a being's needs does not seem a great step forward. No, the difference between the animal and the human is rather mental, due to the slow growth of something which we may call the Personality. It is this slowly developing mental equipment that has differentiated Man and enabled him gradually to adapt Nature to his needs and himself to his surroundings.

Early humanity was nurtured in adverse circumstances, for during its infancy came the Great Ice Age, when at times, at any rate in the northern hemisphere, life must have been desperately hard, and yet we have evidence of Man living right through the glacial epochs. His dawning intelligence must have been the one thing which saved him, for, from a bodily point of view, he is not well equipped with weapons of offence and defence for a cruel struggle for existence.

Though there were times, during genial interludes in the glacial period, when Man

lived in the open, probably in small encampments scattered haphazard, he did not do so continuously for any length of time. During long periods included in the range of our study Man lived much in the mouths of large caves or under over-hanging rocky shelters on the sunny side of valleys. He did not live at the end of deep caves, which are usually very damp and where artificial light would be required; where, moreover, he, or his family, might be cut off from the exit by an intruding cave-bear!

It may be asked how we know anything about these people who have left no written records. Our knowledge is gained (1) by excavating and exploring their "homes," and (2) by examining a very wonderful and naturalistic art which was practised by certain peoples at certain periods, and which to-day is sometimes found emblazoning the walls of deep caves, and which was used, as we shall see later, for magic purposes. In these ways we are able to get glimpses through the veil that shrouds the thoughts, ideas and aspirations of primitive Man.

Let us for a moment visit one of these "homes," and see what we can learn from its examination. But first let us suppose an

ordinary room, and in it a large family; a room that the children and children's children of that family will continue to inhabit for thousands of years as their ancestors have done before them. In this room fires are made, food is cooked and eaten, tools are manufactured, broken, and thrown aside, and skins prepared for clothing. Nothing in the nature of a charwoman is employed, and but little cleaning done. What should we find at the end of a few thousand years? The dirt and rubbish on the floor would have accumulated to such an extent that it would be doubtful if the inhabitants could get in by the window, to which level the floor would have risen. The room would be gradually filled with what are called by archæologists "deposits." If the floor of the room was level, and the many families had not huddled in one corner but had spread themselves over their room, the accumulation of rubbish would form definite and fairly horizontal layers. If conditions of climate, etc., altered, and the inhabitants were driven out, there might be an accumulation of material unconnected with the presence of Man, during a period in which the room was untenanted, or only visited by animals. If the walls were

made of thick lime plaster, and from some climatic reason became very damp, a limy layer might be laid down on the floor, by the percolating water removing the lime from the walls and re-depositing it on the floor. Even if habitation by Man had been continuous various layers might still be distinguished by slight differences in colour or texture.

Now let us visit our prehistoric "home" and see if we can discover anything further. As in our imaginary room, the layers on the floor contain, and in fact are in great part composed of, rubbish thrown down by Man, including (1) Tools (industries) and (2) the broken bones of animals which had been eaten (kitchen refuse). Remembering how these layers were deposited, it will be clear to us that, provided no disturbance has taken place, anything found in the bottom layer must be older than something found in the one next above; the nearer the original floor level, the earlier in age will be the remains.

When we come to examine the tools and the bones of animals that have been used for food, remnants of which occur in the various deposits, we find that both tools and bones

vary in different layers. The tools sometimes show the introduction of totally new types of implements, due often, as we shall see later, to the incoming of new peoples into the particular area; due sometimes to the slow local evolution of a tool or implement which was gradually better adapted to the particular uses which it served. The bones of the animals, which had been eaten, also differ widely in the various layers. Some animals indicate that the climate was cold and damp, cold and dry, others that it was warm. Thus, the presence of Reindeer shows "tundra" conditions, that of Horse and Bison, those of the "Steppe," while the Stag and other animals indicate an amelioration of climate. Many of the animals are now extinct, such as the woolly elephant (Mammoth), which lived in a cold climate, and Merck's Rhinoceros, which lived in a warm era with the Hippopotamus. All this will be more completely dealt with in the next chapter, and it must be always remembered that animals are not the most delicate of thermometers.

The deposits in our "home" would then contain remains of a certain number of different industries, or collections of tools and

worked bones, forming a definite sequence in age, moreover the sequence of these industries, that is the order in which they occur one above the other, is found to be constant in whatever deposit we make diggings. Naturally every stage in the sequence does not necessarily occur, unless the rock shelter had been continuously inhabited, which is rare. But from the study of a number of deposits what appears to have been a complete sequence has been made out. Where the layers are thin and in direct contact with one another a certain amount of admixture naturally occurs; but if the layers are thick this admixture is mainly confined to the contact zones. If a layer has been laid down during a time when Man did not inhabit the particular "home," this layer acts as a separating "blank leaf" between two industries, and when climatic conditions have caused this deposit to be of lime (known as stalagmite), then the conditions for observation are most favourable. The main importance of stalagmite is that it seals in the deposits below it, and prevents a sort of "salad" being made by badgers, rabbits, or other burrowing animals which may inhabit the rock shelter at a later date.

These creatures are a great nuisance to the pre-historian!

In the other type of "home" (the open encampment used before a change in climate drove Man to the use of rock shelters) the industries, etc., thrown aside by Man were buried in gravels that were being laid down at the particular time, and it is in these gravels that they are found to-day. The tools tend to be less well preserved for us, and sequences are less easily made out, though it is often possible, from a study of the super-position of various layers containing industries, to gain some idea of their history. On the other hand, the gravel layers are especially useful to us for correlating the age of early industries with definitely dateable geological deposits; and, as we shall see, more especially for correlating particular industries with various phases of the Great Ice Age.

When we examine the industries of these early folk we find no trace of pottery, no indication that agriculture was practised, no remains of domestic animals, not even the dog. It is only at a time just after the period with which we are dealing that domestic animals, pottery, and the practice of agri-

culture appear. At a still later date the use of metal was discovered. The first metals were Copper or Bronze, Iron not being worked until a far later date.

Archæologically speaking, the history of Mankind in Western Europe can be divided into three main periods: —

(1) The Steel and Iron Age, which dates from our own time to roughly 1000 B.C.

(2) A Bronze and Copper Age, dating back in certain highly cultured areas, such as the Mediterranean Basin, from 1000–3000 B.C.

(3) An Age previous to this when the only materials used by Man that have come down to us to-day were Stone and Bone. This Stone Age can in turn be divided into two Ages, the Newer Stone Age, called Neolithic, and the Older Stone Age, called Palæolithic. In the former of these, agriculture, domestic animals and pottery were used, and Man often prepared his stone implements by grinding and polishing them as well as by chipping, but the use of metal was still unknown. In Palæolithic times, Man, in Western Europe, was simply a hunter, and his stone implements were made by chipping only, never by grinding or polishing.

The Neolithic period, although infinitely shorter in point of time than the Palæolithic, must from lack of space be practically omitted. Life in Neolithic times was profoundly different from that of the Older Stone Age, owing to the domestication of animals and practice of agriculture, and the study of that period is best pursued with that of the Bronze Age, forming a more or less complete chapter in Man's history, which was to a large extent interrupted (at any rate as concerns the Mediterranean area) by the incursion of new folk from the North, who had discovered the manufacture of Iron, a much more deadly material for weapons.

There are no marked differences between the industries found in some layers, only a steady evolution, while those in other layers show sharp contrasts which probably indicate influences from new incoming peoples. In the first case the industries form what is called a "culture." This is a term which indicates something bigger than an industry, but less than a civilisation. Thus, we should talk of the industries of Norwich, the culture of Great Britain, and the civilisation of Western Europe.

If the sequence in our imaginary "home" were complete we should find traces of all the various cultures that had prevailed in the area, each culture being composed of a number of industries of slightly different dates. These cultures have been named after localities or stations where the particular type is well represented, or was first studied.

At the cave of Mas d'Azil in the Pyrenees, and in the Tardenoise in north-east France, two industries are found that are just earlier than the earliest Neolithic Age. Though these industries seem different, evidence has been produced that they belong to the same main culture, which is therefore called Azilio-Tardenoisean. Earlier than these is the so-called Magdalenian series, named after La Madeleine, a large rock shelter on the river Vézère, opposite the château of Marsac, near Les Eyzies, Dordogne, France, where this culture is well represented. Still earlier than these are the Solutrean industries, named after a rock shelter under the steep side of the hill of Solutré, near Macon, France. Earlier yet is the Aurignacian culture, named after a small cave called Aurignac, near S. Gaudens, in the Pyrenees.

These four cultures together form the so called Upper Palæolithic period; before this comes the Middle Palæolithic period in which the Mousterian culture prevailed, so called from the cave of Le Moustier, some miles above Les Eyzies, in Dordogne. Still earlier is the lower Palæolithic period, possessing two cultures. The later is known as Acheulean, because tools of this age are commonly found in the gravels of S. Acheul, a suburb of Amiens; the earlier is called Chellean, because tools of this date are commonly found in the gravel pits at Chelles, on the Marne, near Paris.

Any industry geologically earlier than the Lower Palæolithic, but later than Tertiary times, is usually described as Pre-Palæolithic, while for Tertiary times the term Eolithic has been suggested. Although this term has to some extent become connected with a controversy as to whether certain chipped flints were really flaked by Man or not, it is not an unsuitable name to retain. The problem of these very earliest cultures will be discussed in another chapter.

Steel, Iron, Bronze, Copper	To-day	1000 B.C.	Further divided into various sub-divisions.
	1000 B.C.	3000 B.C. (in certain areas)	

			Type tools.
Stone	*Neolithic*		
	Upper Palæolithic	Azilio-Tardenoisean	Harpoons. Pigmies; Burin.
		Magdalenian	Harpoons and Bone Lance Points.
		Solutrean	Laurel leaves.
		Aurignacian	Points; Special Burins; Scrapers.
	Middle Palæolithic	Mousterian	Side Scrapers and Mousterian Points.
	Lower Palæolithic	Acheulean, Chellean	Various types of Coups-de-Poing.
	Pre-Palæolithic [1]	Earlier than Chellean	
	Eolithic	In Tertiary Deposits	Chipped flint. (See chapter on earliest industries)

[1] Perhaps more exactly Pre-Lower-Palæolithic.

As a rule, the remains of Upper and Middle Palæolithic cultures are found in

cave deposits, while the Lower, Pre-Palæolithic, and the Eolithic cultures are found in gravels, that is, in open stations. In the first case the remains are *in situ,* in the second usually " travelled," that is, carried by water agency away from their original home, sometimes for long distances. In the latter case only the larger and more resistant stone tools have been preserved, and these often show the weathering and rounding action due to transit and the effect of the water which brought them.

Actual skeletons are occasionally found, and, from a study of these, two profoundly different races of Man have been deduced; an older, the Palæoanthropic, and a later, the Neoanthropic race.

The Palæoanthropic race includes all people earlier than the Upper Palæolithic folk, and will have to be sub-divided as more evidence accumulates. We know hardly anything definite of the skeleton of Man before Middle Palæolithic times, and this early type of Mankind is often known as Neanderthal, a name taken from a small rock shelter near Düsseldorf, where the first discovery of human remains of this type was made. The Upper Palæolithic cultures were

introduced into Western Europe by members of the Neoanthropic stock. This is a new term that has not as yet spread very widely in literature. It is more or less identical with the term "Cro-Magnon race," which is used throughout French literature. The rejection of the title Cro-Magnon, and the coining of a new word, Neoanthropic, is justified, even if due perhaps to a rather pedantic reason. The fact is that Neoanthropic Man includes a number of modifications of a basal type, due partly, perhaps, to a distinct development, partly, maybe, to a mingling of races. Cro-Magnon is a little rock shelter near Les Eyzies, where skeletons of this date have been found. These skeletons only illustrate one of the modifications of this race, and it is therefore a mistake to use the term Cro-Magnon generically. The student who delves into this branch of the subject should remember, however, that the term Cro-Magnon is often identical with Neoanthropic, unless the actual skeletons from the Cro-Magnon rock shelter or others exactly resembling them are in question.

If it be true that the long-headed Neolithic Man of the south, often called the Mediterranean race, is partly derived from

the Tardenoisean modification of Neoanthropic Man, then some of the inhabitants of Europe to-day (especially those living round the Mediterranean) can claim to have Upper Palæolithic blood in their veins. The long-headed people of Northern Europe and the round-headed people of Central Europe come from very different stocks. Round-heads appear first in Europe in Neolithic times, coming from an unknown cradle of civilisation, and what their exact relationships are remains obscure.

Having defined our subject, it will now be necessary to consider in detail to what other allied subjects Pre-history is closely related. There are three such subjects: Geology, Ethnology, Anatomy or rather Human Palæontology.

Geology is the history of the earth, and as such is concerned in part with the actual material of which the earth is made, in part with the various manifestations of life in the different eras (remains of which are known as fossils), and in part with a connected history of the whole, from the earliest times even before any life appeared on the earth until our own day.

The geologist has divided this history into

what can be best described as five Volumes and an Introductory Chapter. The latter deals with the few fragments of knowledge which have been gleaned of the history of the earth before any life appeared on it. Of the five Volumes the first two are called the Primary or Palæozoic, and the Secondary or Mesozoic. These two do not concern us, as even the immediate ancestor of Man had not then appeared. Nor have we much to say of the fifth or recent Volume, for this starts with Neolithic times and its pages have not yet been closed.

We are therefore concerned with Volumes 3 and 4. The first of these is known as the Tertiary, and the other as the Quaternary or Pleistocene. No hard and fast line can be drawn in Nature between the end of one volume and beginning of the next, but just as some prominent event in history marks the commencement of a new era, so a change in geological conditions over large areas forms a boundary between the volumes. A written volume is divided into chapters, and these again into paragraphs, and the same system is followed in the case of geological history. The events that form the chapters are naturally less important and universal

than those that divide the volumes, and still more is this true in the case of paragraphs. As the different cultures left by Man, and occasionally the actual skeletons of the men themselves are found in geological deposits, these remains of Man, and of his various industries, can be definitely classed as fossils. Sometimes the age of the deposit can be determined by the geologist knowing the date when the gravels were laid down, but more often the geologist finds that he has to be helped in dating his gravels by a study of the industries which they contain. Naturally, then, the geologist (more especially when studying later geology) has to be in close touch with the prehistorian; though clearly he is more interested in the cultures found in open stations, than in those boxed up in caves. The prehistorian, who throughout his study uses geological methods, must have a competent knowledge of later geology. He should also be able to identify the bones of the commoner animals of the Quaternary age, and know something of vertebrate Palæontology.

Ethnology is the study of modern primitive peoples. It describes and compares their industries and cultures, their social life

and their psychology. The prehistorian must therefore keep in close touch with the ethnologist who can often explain obscure points by analogy with the primitive peoples of to-day. Some of the modern savage peoples may have degenerated from more advanced races, but in most cases we have to deal with an arrested development. It is therefore correct to speak of their modern cultures as primitive. For example, the Bushmen paintings are similar in many respects to those which will be described later as the "Eastern Spanish style." Some day a real connection may be established between these two peoples of such different eras but who painted such similar pictures. In all probability we shall then find that they are both derived from the same racial stock, the Bushmen being a later survival.

In the Upper Palæolithic art we sometimes find paintings of human hands, apparently mutilated by the removal of some of the fingers or finger-joints. The ethnologist helps the prehistorian by quoting certain primitive peoples who have the same practice for definite reasons, such as to avert evil threatening the homes or the cattle, or as

a sign of mourning. Although Palæolithic Man had no domestic animals, and although it is clearly dangerous to apply the motives of modern primitive peoples wholesale to these early folk, such comparisons between two groups of humans widely separated in time are by no means to be neglected.

It is the painted cave temples of Upper Palæolithic Man and the "homes" of the same period containing decorated objects which are most interesting to the ethnologist. A few tools and kitchen refuse are poor aids in the study of Man's psychology, and so the ethnologist is more interested in the cave temple period from Aurignacian to the end of Upper Palæolithic times, than in the earlier ages. The prehistorian thus forms a link between the interests of the geologist and the ethnologist.

Anatomy. Very occasionally human skeletons occur in the deposits. These finds are at present too scanty to allow of anything like the construction of a methodical table of evolution. Moreover, the whole question is complicated, in Western Europe at least, by the number of different races which have been evolved elsewhere, and have migrated into the area. The discoveries which have

been made are of extraordinary interest to the anatomist and the biologist. Types of skeletons like that of Neanderthal Man have been found, showing a structure profoundly different from our own. The study is still in the stage of tabulation of results, and more discoveries are needed. When these have been made in various parts of the world, it may be possible to reconstruct some sort of world-wide evolutionary picture.

The main difficulty is that of accurately dating the skeletons. As often as not the age of the gravels or deposits in which the bones are found is not exactly known, as in the case of Broken Hill, where the Rhodesian skull was found. Unfortunately, therefore, no accurate dating of this skull is possible, and we are still uncertain whether Africa was at some early date a cradle developing the Neanderthal type which spread thence over Europe, or a museum which received from the north a type of Neanderthal Man which had been modified by admixture, but retained some very primitive traits. A cast of the Rhodesian skull brain recently made shows no resemblance to that of Neanderthal Man. This side of Prehistory is necessarily technical and is very slightly treated of in

this book, as it really forms a separate branch of study.

Before beginning the study of the geological conditions under which primitive Men lived, it is well to give a brief history of what is already known of our subject, necessarily limiting ourselves to the more interesting and important of the discoveries.

England was the first country to recognise a stone implement, and to realise that it had been made by the hand of men. It was as long ago as 1690 that some workmen digging in Gray's Inn, London, came across a pear-shaped chipped flint (what we should now call a coup-de-poing). This was studied, described, and considered to be of Roman date. No further finds were made for more than 100 years, when a certain John Frere, F.R.S., discovered similarly chipped flint implements in brick earth at a pit near the village of Hoxne, Suffolk. He was greatly struck with the position in which they were found and claimed that they must be very old indeed, belonging to a date even beyond that of the present world. The scientific world of that day was incredulous. Already in 1825 the Rev. John MacEnery had begun digging in Kent's Hole, Torquay. Some

three years later, in 1828, a Frenchman, M. Tournal, clearly demonstrated the association of man-made implements with the bones of a Quaternary fauna. These were found at the grotto of Bize (Aude), and a few years later, in 1833, similar finds were made by Schmerling when excavating in the neighbourhood of Liège. At about this date also a piece of bone covered with engravings was found near Sévigné (Vienne). This was the first example of Palæolithic art to be discovered, but at the time it was said to be of late Celtic age. The next contribution was made by a Dane, Christian Thomsen, who suggested the three-fold division of the history of Mankind into Iron, Bronze, and Stone ages. This division, with certain elaborations, is the one still used to-day.

The next event of any importance was the publication, by M. Boucher de Perthes, of Abbeville, of his finds of chipped flints in the alluvial deposits of the Somme. He was not believed, and it was not till twelve years later, in 1859, after Prestwich and Evans had visited Abbeville and Amiens, and after Evans had himself found an implement 17 feet down in the gravel, and Prestwich had read a paper before the Royal Society, that the scientific

world became convinced that these chipped flints were really the work of men living geological ages ago. In 1856 the famous Neanderthal skull was discovered and created a stir, though the statements as to its discovery were not believed at the time. Meanwhile decorated objects had been dug out of the deposits and had been recognised as being also of Quaternary age. The French savant and explorer, M. Lartet, in association with the English banker Christy (a happy combination!), published their first article on the art of the "Reindeer Age," as it was called from the quantity of reindeer bones found in the deposits of that age. This was in 1864.

In 1867 the problem of the existence of Tertiary Man was propounded by the Abbé Bourgeois, at the Congress of Paris; and in 1868 the skeletons of Cro-Magnon were discovered in the course of making the railway which to-day runs from Périgueux to Agen. From 1874–1877 diggings were carried on at the Victoria Cave at Settle, in Yorkshire, but the layers there had been so mixed up by burrowing animals as to be of little use to the investigator. Only industries of Azilio-Tardenoisean age and of much later Romano-British times were discovered.

In 1876 Boyd-Dawkins and Mello found interesting industries of Upper Palæolithic age in the cave of Cresswell Crags (Derbyshire). In 1879 the daughter of the Marquis de Sautoula discovered the glorious frescoes in the cave of Altamira. This discovery will be described in a subsequent chapter. Nothing further of special interest occurred until 1886, when the Spy skeletons were discovered, which demonstrated the genuineness of the Neanderthal specimen, and proved the existence of a very different race inhabiting Europe at a remote period. About the same time a noted prehistorian, M. Piette, discovered industries in the cave of Mas d'Azil in the Pyrenees, which were post-Magdalenian and which he termed Azilian. 1888 saw the discovery of a Magdalenian skeleton at Chancelade, near Périgueux, Dordogne, and 1894 that of *Pithecanthropus erectus,* a Being of Tertiary age in Java. 1895–96 confirmed the authenticity of the cave art at La Mouthe and Pair non Pair, as will be described in a subsequent chapter. From 1901 onwards discoveries of painted caves have been made in both France and Spain, and these discoveries continue to our own day. The Mauer jaw and the Chapelle-

aux-Saints skeletons were found in 1907–1908; while a skeleton from Combe-capelle was unearthed in 1909. In 1911 bas-reliefs representing human figures were found in the deposits of Laussel near Les Eyzies (Dordogne) by Dr. Lalanne, and a year later the famous clay Bisons in the Tuc d'Audoubert, near St. Girons (Ariège) were revealed. A skull was found at Piltdown (Sussex) in the same year, by Dawson. Cantos de la Visera, near Monte Arabi, not far from Yecla, South Spain, painted in the Eastern Spanish style, was discovered in 1914 by the writer, and is of some importance as helping to correlate this group with the northern one. The painting of the sorcerer at the Trois Frères, near St. Girons (Ariège), so interesting to the prehistorian who is trying to realise the psychology of Upper Palæolithic Man, was only described in 1920.

We thus see that the subject is a living one, continually growing as fresh finds are made, and all our ideas and theories have to be kept in a fluid state. Certain general lines for study have been laid down, which will be briefly explained in this little work. At the same time, in order to construct a connected story, theories and even guesses

must be used, and though some details will very likely have to be rejected or altered, the principal lines of study will probably remain unaffected by future discoveries.

CHAPTER II

CONDITIONS, GEOLOGICAL AND OTHERWISE

(*Illustrations of the animals mentioned in this chapter, either painted or engraved by Palæolithic man himself, are reproduced in Chapter IX.*)

THE analogy of Volumes and Chapters has already been used for stratigraphical geology, and it has been mentioned that, in this book, we are only concerned with Volumes 3 and 4, viz. Tertiary and Quaternary times. It will be our task in this chapter to describe briefly the varying climates, and the changes of fauna that took place in these two Volumes, also the special phenomena exhibited by the Glaciations of the Great Ice Age, and to correlate the various geological and archæological conditions. Finally, an attempt will be made to date some of the palæolithic cultures in years. This must, of course, be only provisional and tentative, but the results are of some considerable interest.

The Tertiary, or third Volume, many of the " chapters " of which are well represented in England, can be roughly divided into a lower and an upper series. During the first of these the climate was considerably warmer than it is to-day. From the evidence of the Fauna and the Flora we find that the temperature in England must have been somewhat similar to that now prevailing in Central Italy. No remains, whether in the form of skeletons or industries, have been found which can be accepted as undoubtedly human. The upper series is divided into two chapters, an earlier Miocene (not occurring in England), and a later Pliocene, well represented in East Anglia. The occurrence of late Tertiary Pliocene deposits are by no means common in Europe, and so East Anglia has a real interest for prehistorians generally. These Pliocene deposits of East Anglia take the form of marine sands, and so-called " crags," which were laid down in comparatively shallow sea water when large tracts of East Anglia were slightly submerged owing to earth movement. Probably, if we could transport ourselves back to that time, we should find dreary flats with long spits of sand running out into the shallow water,

the sands continually shifting their position. In some respects these conditions were not unsuitable for human life if a predominant diet of shell-fish is preferred. The "strand-loopers" of South Africa lived not long ago under similar conditions as regards food.

With the beginning of Upper Tertiary times a new set of conditions appears, the climate becoming gradually colder. This is clearly shown from a study of molluscan shells, and if we examine those coming from the various layers corresponding to the paragraphs of the Pliocene chapter, we shall find that the warmth-loving varieties gradually diminish while cold-loving types appear. In East Anglia, at the beginning of the Fourth Volume or Quaternary Age, a deposit which is known as "Cromer till" or "Contorted Drift," was left by a glacier. The ice must have come from the Scandinavian mountains right across the North Sea, for the "till" often contains blocks of rhomb-porphyry and laurvikite, which do not occur in England, but must have been torn from the mountains of Scandinavia and carried to England in the ice. Laurvikite is the bluish-green rock much used for fronting the ornamental columns outside restaurants, etc., and is, there-

fore, known by some members of the geological survey as "pub-frontite"!

We have reached the dawn of the Great Ice Age, and some explanation of this period will not be amiss.

During the Great Ice Age the mean temperature of Western Europe fell so low as to produce glacial conditions. The whole of the northern hemisphere was not covered with sheets of ice as is the case of Greenland to-day, but where mountain masses occurred these were the cradles of glaciers that stretched far into the plains; the so-called "Arctic circle" was naturally a good deal farther south than it is to-day. It is unnecessary for there to be any exaggerated fall in the mean annual temperature in order to introduce a glacial epoch, but only enough to permit of the formation of large masses of snow and ice in mountain regions. These masses of snow and ice would not disappear during a short hot summer, and would tend to depress the temperature to zero, even if the sun heat were considerable. Close to these tracts of ice and snow the temperature would not rise above the freezing point till all the ice was melted. The Great Ice Age is not a single period; it is a number of glacial

periods separated from each other by warmer periods. These will be discussed subsequently. There have been many explanations offered to account for the Great Ice Age; some of these involve astronomy, others geographical changes. The student is referred to books dealing more particularly with this subject. (*See* "Bibliography," Wright.)

Some of the phenomena connected with glaciation must now be described. These can be divided into two groups: (1) Phenomena connected with glaciers, (2) River terraces. A glacier is a river of ice flowing down a mountain side, the rate of movement being exceedingly small, sometimes not more than a foot or two in a year; the weight of a moving mass of ice has almost irresistible force, the rocky bottom of its channel and rocks in its path are broken up and covered with parallel scratches due to the grinding of the flowing ice holding in its grasp pebbles which act as carving tools. Earthy material falling on to the glacier or torn from its banks is carried down on or in the ice, and is brought along until such time as the ice yields to the warmer conditions which the glacier has reached in its advance. This material is then discarded in crescent-shaped

mounds called "terminal moraines." These mounds have their concave sides facing the glacier. If for any reason the glacier increases in size or the general temperature of the plains decreases, the glacier will advance into the plains and a new terminal moraine will be formed, further from the mountains than the first one. Similarly, a retreat of the ice towards the mountains will take place if the temperature rises and the glacier diminishes.

River terraces. Ordinary rivers have the power of doing a certain amount of work in deepening their beds and removing material. This depends on the velocity of the river, due to the slope of the valley and the volume of water in the river.

Let us imagine a river flowing from a glacier. A certain amount of material will be removed from the terminal moraine, being held in suspension by the flowing river. If for any reason the volume of water diminishes, this will be deposited in the shape of sheets of gravel. Then suppose that for some reason the volume increases, the river will be able to do more work, and in the course of deepening its bed will largely remove the gravel sheet it had just laid down. Patches along the sides

of the valley will escape destruction, and, as the river deepens its course, will remain as gravel terraces high up above its banks. A fresh diminution of volume would then spread out a fresh sheet of gravel on the floor of the new valley, which, in turn, would be largely removed if conditions were such as to increase the volume of the water a second time. A second terrace would then be left above the banks of the river, below the level of the first terrace, and so on.

It may be pointed out that in the case of deposits in which the layers accumulate one on top of another, the bottom layers are the older. In the case of river terraces, which are not due to accumulation but to denudation, the lower the terrace the newer it is in age. On the other hand, when considering the formation of the several layers of any particular gravel terrace, one must remember that each one is due to spreads of gravel at times when the volume of water is dwindling. The ordinary law of super-position holds good, and the bottom gravels of a terrace are older than the upper gravels.[1]

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[1] Another suggestion as regards river terrace formation has lately been put forward which has been favourably received by Professor Sollas. It depends on

In the Baltic areas, in regions near the Alps, and in the Pyrenees, there are two very distinct terminal moraines at different distances from the mountains. The more distant one is older than the one nearer the mountain; for the nearest one rests on morainic material left by the glacier which formed the outer terminal moraine. Of the existence of these two there is no question, and they clearly indicate the presence of two distinct glacial periods, each of which existed for a sufficient length of time to

changes in the relative position of land and sea due to earth movements. Around the Mediterranean and the north-eastern shores of the Atlantic four ancient beaches can be traced, which occur at constant heights, the oldest resting on a Pliocene deposit. It is affirmed that the three lower beaches correspond with the three lower terraces of the Rhône, Somme, and Isser (Algeria) valleys; that these terraces, which yield at their base a fairly warm fauna (*Elephas antiquus* and *Hippopotamus*), were formed during a warm period by the sea when it invaded the land, owing to regional earth movement. It is considered that Quaternary Times as a whole were warm, though divided by short glacial periods, at which time the sea retreated from the land. The alternate advance .and retreat of the sea can be explained, it is said, by a general deformation of the globe, due perhaps to the weight of the ice caps of the glacial periods. These ideas should be kept in mind; but, even if partly true for certain cases, it is difficult to see how all the phenomena in various districts can be thus explained. For further information and references to original authors the article, "Man and the Ice Age," by Professor Sollas (*Geological Magazine*, Vol. LX., No. 703, Jan. 1923) should be consulted.

allow of the formation of terminal moraines. The former of these periods was the more intense, for the terminal moraine is found further from the hills. The remains of two other older glaciations have been identified in the Alps and the Pyrenees. They are less clearly marked, for the third glaciation has tended to plough up all the remains of the former glaciations over which it passed, and being of considerable magnitude, little has escaped it.

Fortunately for us, the last glaciation was less severe than its predecessor and did not reach far enough into the plains to obliterate it. We have, therefore, some remains left.

When we come to explore in the Alpine and Pyrenean valleys we often find four terraces, the upper two being less clearly marked than the lower. The dwindling of the water which laid out the gravel sheet was caused by the increase of ice and the consequent removal of water vapour which followed on a glacial period. The liberation of water due to the melting of the ice in an inter-glacial period increased the volume of water in the river, enabling it to cut its way down to a new level leaving a river terrace of gravel above its bank.

The student must be on his guard in areas such as the Thames valley, where the terrace

problem is complicated by differential land movements. These movements, by making the slopes of the river bed more abrupt, may enable the river to cut its way rapidly down to a new level, and thus leave a river terrace without there being any increase in the volume of water.

In areas far removed from glaciers there was still a decrease and increase in the volume of water caused by the removal of water vapour from the air in the formation of glaciers in the glacial periods, and its subsequent liberation during inter-glacial periods.

The Great Ice Age, then, at any rate in South France, would seem to be composed of four glacial, and three inter-glacial periods; the glacial periods are known as (1) Günz, (2) Mindel, (3) Riss, (4) Würm, after four little rivers flowing northwards from the Alps. M. Boule, of Paris, claims that there were only three glaciations, regarding the Günz and Mindel glacial periods as parts of the same glaciation.

The last glaciation was followed by a period which gradually became warmer until modern climatic conditions were attained. The " warming up " after the last glaciation was not constant, there being several minor

oscillations of temperature. At first, the temperature rose, in what is known as the Achen period, then sank so low as to give very nearly fresh glacial conditions in France. This is known as the Bühl period. After this the temperature rose to the mean annual temperature of to-day, there being two stationary moments known as the Gschnitz and the Daun.

In England, further north, the mean annual temperature was naturally lower, and we should not therefore expect to find the inter-glacial periods so marked, especially after what has been said of the difficulty of removing glacial conditions when once formed. We have evidence of one glaciation in the "Cromer till," which almost certainly corresponds to the continental Riss period, and of a later glaciation corresponding to the continental Würm, for the "Cromer till" is first succeeded by sands, the fauna of which indicate a warmer temperature, and these sands are in turn followed by a chalky boulder clay, a morainic material laid down by an actual ice sheet. This chalky boulder clay, which covers a great deal of East Anglia and has destroyed many of the remains of the former Riss glaciation, seems to have

been laid down by an English ice sheet, for the rocks found in it near Cambridge have been brought from south Scotland and the Lake district, and not from Scandinavia, as is the case with the rhomb-porphyry and laurvikite of the "Cromer till." In the north of England lowering of temperature in Bühl times seems to have given rise to a true glacial period, and the latest drifts in the north Welsh caves are probably of this date. In the south, however, though the conditions were very cold, there does not seem to have been an actual glacial period. The arctic beds of the Lea valley would seem to be of this age; but the peats of the Thames valley belong to the beginning of the fifth or recent Volume, and their age being Neolithic and Bronze we are not concerned with them.

It will next be our business to attempt to correlate the archæological conditions with the geological record. Perhaps the best method will be to detail the data that we have, and afterwards see where this data leads us.

(1) At various places in south-east France deposits containing implements, evidently of Magdalenian age, are found resting on moraines belonging to the last glaciation. These

industries must therefore be of post-glacial date.

(2) At a cave (Bouchiéta, near Tarascon-en-Ariège) in the Pyrenees, Mousterian implements are found in a deposit that rests on moraines of the Riss glaciation. This cave opens on the side of a hill at a height never reached by the Würm glaciation, for the remains of this date occur far below.

(3) At a cave at Cotencher, near Neuchâtel, it has been claimed that Mousterian implements have been found in deposits that were laid down by the last glaciation.

(4) In the Somme valley river terraces are found covered by deposits known as "loess." Loess, which usually consists of fine buff-coloured sands, was laid down by wind action during the cold dry epochs which preceded and followed a glacial period. Only two periods of loess (associated with the last glaciation) have survived. Being a wind-blown deposit its deposition is independent of river systems, and it is equally found on the tops of hills and in valleys. The only other agent which is independent of river systems is ice, which under certain conditions can deposit material even on the top of hills. Both deposits of loess are found near Amiens,

the first being clearly pre-Würmian, for it is found covering the top three terraces, but not the bottom or Würmian terrace, we therefore conclude it had not yet been formed. This deposit is known as the Older Loess. The Upper or Younger Loess covers both the Older Loess and the bottom terrace, and is therefore post-Würmian. The Older Loess contains Acheulean implements, while Mousterian implements are found at the very bottom (the oldest portions) of the Younger Loess; and above them (in the newer portion) Upper Palæolithic implements occur.

(5) Acheulean implements have been found in a deposit that rests on the gravels of the Rissian terrace in the Garonne valley. As the deposit rests *on* the terrace it must be newer than the terrace itself.

(6) At one or two places, notably at Conliège in eastern France, Lower Palæolithic implements have been found in a deposit that rests on the moraines of the Riss glaciation, in an area beyond that which was reached by the ice of the Würm glaciation.

We are now in a position to collect our data and make a definite correlation. 1 and 4 show us clearly that the Upper Palæolithic

is just post-glacial, and as the fauna of Magdalenian times indicates very great cold, we shall probably not be very far wrong if we consider that the Magdalenian period is of Bühl age.

2, 3 and 4 show that the Mousterian era is closely associated with the Würm glaciation and the arctic fauna confirms this. The Mousterian period probably straddled right across the glacial epoch. Life must have been very unpleasant in those days!

4 and 5 show us the Acheulean period as being post-Riss. Chronologically, it occurs just before the Mousterian, and is found associated with a cool fauna. Probably we shall not be far wrong in assigning the Acheulean era to the latter half of the Riss-Würm inter-glacial period. The Chellean period, with its warmth-loving fauna, preceded the Acheulean. The pre-Palæolithic times, which occupy the earlier glacial and inter-glacial eras before, link up with the culture of Man of late Tertiary times. Pre-Chellean industries do not greatly differ from Chellean except in being more primitive.

We must now consider the various Quaternary animals associated with Man. These vary with the different climatic conditions,

but though the animals can to some extent be used to determine temperature, they are influenced not only by temperature but also by conditions of moisture. Herb-eating animals are more useful for our purpose than the flesh-eaters, food for the former being more susceptible to changes of climate than is the case with the more varied diet of the flesh-eaters. Some of these Quaternary animals are now extinct, others only live in the north, no longer inhabiting France and Britain. We know a fair amount about the animals, for not only are their bones found in deposits, but Palæolithic Man often executed paintings and engravings of them on pieces of bone and stone and on cave walls. Since his representation of animals which still exist in other parts of the world is naturalistic, we conclude that his pictures of animals which are now universally extinct also resemble the originals.

Chellean times were warm, and there were probably large forests and a rich fauna. If we took a tour through Europe at this period we should find many differences. For one thing, we should look in vain for the English Channel; England was separated from France only by a broad forest-clad valley with a river

running down the middle. Along the river banks there roamed large herds of elephants of a kind allied to the modern Indian variety, but extinct to-day. There was also the sabre-toothed tiger with great teeth projecting like tusks. To the west of Ireland, which was only separated from England by a river and a lake, land stretched for many miles. Touring southwards we should not find our course interrupted by the Mediterranean, for this sea then consisted only of two lakes, there being two land bridges connecting with Africa, one at Gibraltar, and the other through Sicily. If we chose to go eastward, we should have a difficulty in getting into Asia, for a broad gulf stretched from the Arctic seas to the Caspian.

We should find man a simple hunter, living for the most part in open encampments, his chief tool being a roughly-chipped stone axe (coup-de-poing), a tool which will be described later. The genuine Chellean climate gradually changed, and if we delayed our tour to the time of Acheulean Man, we should find that colder conditions had set in. This change in temperature would be shown by the presence of so-called " mixed " fauna, the remains of which we find in Acheulean

deposits. This would mean that though the warmth-loving fauna still survived, the cold-loving varieties had begun to appear. We should not only find the warmth-loving elephant, but at the same time the woolly elephant (the Mammoth), now long extinct, though actual remains have been dug up from the "cold storage" of Siberia.

If we had chosen a slightly later date, we should find that these cold conditions had increased, only a few of the more hardy warmth-loving animals having survived, and these being forced to adapt themselves to the new conditions. The climate must have been rather like that of Spitzbergen to-day, and especially disagreeable in the vicinity of mountain masses from which issued vast glaciers. Man under the stress of cold had abandoned the open encampments, and been driven to live under over-hanging rocks or in the mouths of caves. We should find a strange sort of Man, with beetling brows, large head, curved thighs, and a shambling gait. To talk with him would be a difficulty, for with the peculiar formation of his jaw it is hard to see how he could have had much articulate speech. Mousterian Man was probably not in the direct line of evolution,

but a degenerated off-shoot from the main stock. Owing to the cold, clothes made from the furry skins of animals were necessary, and it is probably for that reason, if for no other, that we find in the deposits of this age such a large number of scraping tools, which would be needed for cleaning and preparing these skins. We must not be surprised to see fires, for the discovery by man of the use of fire was made at some unknown previous date. If we wandered into the hills we should find a few of these people living on little islands surrounded by the big glaciers. Life must have been hard and cruel!

Suppose we had delayed our tour until after the last glaciation, a very different picture would have unfolded itself. Though the configuration of the land remained much the same, and the Straits of Dover and much of the English Channel did not exist, the great extensions of land of Chellean times would not be found. The climate would resemble that of part of Siberia to-day, with short, hot summers, and long, bitter winters. We should find a certain number of trees, principally oak and chestnut. Man still lived under over-hanging rocks or in the mouths of caves, but he was a very different type from

the older Mousterian beings. These new people had high foreheads, and except in minor details were not unlike my readers.

Let us go back in imagination to those early days, and try to conjure up the scene in a word-picture. High up on the hillside facing the sun is a rock shelter in the limestone cliffs. The inhabitants can look down on the river winding below, and on the marshes in which in Magdalenian times the hairy two-horned Rhinoceros might be lurking. The dwellers in the shelter are grouped round a fire where cooking operations are in progress. A woman is grilling bison steaks, the last of the family store of fresh meat; and the men, knowing the larder is empty, are preparing to start on a hunting expedition. One man, having finished eating, goes to the edge of the terrace and gazes up and down the valley, just as his forebears for countless ages have done before him. Two youths look up once or twice from their task of scraping with a flint tool a magnificent cave-bear skin, which is pegged out on the ground, and destined for a garment for the hunter who gazes down at the valley. The women, when the meal is over, build up the fire with branches, and sit round preparing their fish-

hooks, for when the men go off to hunt they will go down to the river, and try their luck; there are fish like our salmon and trout in the river. One woman, vainer or luckier than the rest, is piercing some horse's front teeth which her man has given her to make a necklace. The hunter on the terrace turns and, making a sign to the youths that he is ready to start, enters the shelter to fetch his few weapons.

The hunters having started, the women, taking the children with them, go with their fish hooks towards the river, where some of them fish, and others collect wood and roots, aided by the little ones. A figure rises slowly from a dark corner of the cave whence a sound of splitting bones comes, but it is not the crunching of a wild animal devouring its prey; no animal splits bones lengthwise as these have been split; it is unmistakably the work of a man. And it is a man who comes slowly forth carrying a lamp full of animal fat, and with a moss wick. He leaves the rock shelter, stooping a minute over the fire to light his lamp, then turning away from the sunshine and the view up and down the valley, goes into a deep cave near by. If we could follow into the depths of the cave we

should find the walls covered with figures of animals; one or two of dangerous creatures who are best killed, but mostly of animals which are good to eat. But it is best to leave the sorcerer to his rites, for his object is to gain influence over the animals by sympathetic magic, and we will follow the hunters who are already far away across the river down in the valley. They are on their way to visit a trap, a great pit covered over with branches and reeds. It has not served them well this time; they had hoped for an immense hairy mammoth with great curved tusks nine or ten feet long and a mane of two feet. But the trap is empty. A herd of reindeer moving to fresh pastures is seen against the skyline, but the men do not start in pursuit, for they prefer the flesh of the more rare red deer. They keep a sharp look out; there is always the chance that a Giant Stag (erroneously called Irish *Elk*) may come crashing through a copse, its great branching horns set on a tremendously-powerful head; and the last time they passed this way a great bull larger than the modern animal and with huge horns (Bos primigenius) charged round a corner. No chance of our seeing this creature in modern times, for the last specimen was

killed in the forests of Germany in the Middle Ages. At length they find a bison, which, remembering the excellence of bison steak, they hunt and kill. Laden with bison meat the hunters turn homewards, halting a moment to watch some chamois and an ibex springing up the hillside. The way back seems longer now the excitement of the chase is over, and there is a heavy load to carry. As the hunters approach their home they hear the screaming of women and the shrieks of frightened children. Throwing down their burden and grasping their weapons more firmly they rush to their home. Women and children are flying up the hillside, and on the threshold, in full command of the situation, stands an immense cave bear. He may only have been attracted to the shelter by curiosity, but the sorcerer lay dead on the floor of the cave. A volley of stones and burning brands hurry the bear's departure, and the line of his retreat is marked, for his teeth will be useful for tools, his skin for clothing, and his flesh will replenish the family larder. Now the enemy is driven out, all the cave inhabitants come back and stand chattering and terrified round their dead sorcerer. Then, by order of the chief hunter, they all set to work to

dig a grave at the back of the cave with their flint scrapers and digging sticks. Hour after hour they toil, keeping a big fire burning lest the bear should return. The sorcerer is laid in the grave on his right side, with his knees drawn up, and one by one the women lay beside him their necklaces of sea shells or animals' teeth, and the men their finest weapons, so that he may be well equipped wherever his magic has led him, as befits a great sorcerer. The earth is heaped on him and trodden and beaten down, and he will soon be forgotten by the hunters; only on eerie, dark nights the women, if they hear a strange noise, will think and tell their frightened children that the voice of the old sorcerer comes in the sobbing wind, and that his uneasy spirit moves in the cave's darkness. . . . And there he remained till the prosaic hand of the prehistorian unearthed his bones a few years ago.

If a list of the animals living at this time were made, the same species would be found to exist from Mousterian to the end of Palæolithic times, though the relative proportions of the various species would vary in the different periods. Thus during the coldest part of the Magdalenian age hardly

any Stags would be found, while Reindeer would be plentiful. At another period, during an amelioration of climate, there were many more Stags, and it was not till the end of Quaternary times that many Palæolithic animals became extinct, and others migrated for ever towards the north.[1]

If we climb up that hill through the trees we shall arrive on a terrace before a rock shelter. Here in Magdalenian times there lived a great artist who was possibly also a great hunter. The floor of the rock shelter is paved with stone flags. Let us go back in imagination and follow the artist himself. Looking up whilst waiting for him to start on a hunting expedition we notice that the stone above us is carved with a bison in slight relief. It is more engraved than sculptured, the head with horns and beard standing out well. Take a look at the rock shelter — you will find it decorated with a magnificent frieze of horses. These animals succeed each

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[1] (For a detailed account of Quaternary fauna, and especially of the less well known animals, the reader is referred to more elaborate works on the subject. The illustrations in this chapter are not imaginary, but are taken from the naturalistic drawings which adorn the walls of cave temples, and were the work of Palæolithic Man.)

other along the back wall, some of them being over two yards in length. Follow the artist hunter to the hill tops where on the high slopes he hunts the wild horses which are his chief food. He will crouch at the edge of the woods studying his prey, storing up details of construction and tricks of movement to reproduce on his frieze. One day he will be too tired to hunt, too tired even to sculpture and engrave, his tools will fall from his hands, and he will sink down on the floor which he paved, beneath his artistic triumphs, and the horses and bison of his creation will stare down at the corpse and later at the skeleton of the artist who made them; stare through countless ages, till the scientific explorer comes in the 20th century and shouts his discovery of the artist and his works to the listening world.

The reader will ask if it is possible to assign dates to the various ages. Many students have tried to arrive at some conclusion on this point, and a good deal of effort has been directed to fixing the date of the last glaciation. A. Heim, working from his estimate as to the present rate of growth of the delta deposited by the Muotta in the Lake of Lucerne, came to the conclusion that the ice

had vanished completely from that part of the country sixteen thousand years ago. Baron de Geer, of Upsala, discovered a more ingenious scheme of measurement, a method which attempts have since been made to disprove. He counted the layers of sediment deposited in the sea by the ice of the fourth and last glaciation during its retreat. It was during the summer that these layers were deposited, and they lie like tiles on a roof over the whole of Scandinavia from south to north. Therefore, if the layers of sediment are counted you have the tally of the summers during which they were deposited, one layer for each summer. The layers have certain peculiarities, being by no means all of the same thickness. A series of pits were dug in Scandinavia from south to north, and owing to the distinctive differences in the layers the top of a section in the south can be recognised at the bottom of a section further north. By careful counting we can arrive at the total number of years taken by the ice to retreat from south Scandinavia northwards. This retreat occupied about five thousand years, for the number of layers is about five thousand. Lake Ragunda in the north was drained about the middle of last

century, and by a fortunate chance (the layers having been continuously deposited in the lake from the moment it was uncovered by the retreating ice), when it was drained the layers could be counted and they proved to number about seven thousand. Therefore the number of years from the time that ice covered south Scandinavia to our own day is 7,000 + 5,000 = 12,000 years. The inner terminal moraine, called the Baltic Ridge, marks the southern limit reached by the ice of the last glaciation in north Germany. As the distance covered by the ice in its retreat from Scandinavia is about half that from the Baltic Ridge to the south coast of Scandinavia we should expect to add to our sum half the time taken to do this retreat, viz. 2,500 years. The rate of ice progress increased as it retreated north; it was by no means a uniform pace. At Stockholm the pace was five times as fast as in south Scandinavia. Professor Sollas holds that another five thousand years should be added instead of 2,500, which would make the interval from the beginning of the retreat of the ice of the last glaciation until our own day, seventeen thousand years. Man cannot have lived in south Scandinavia before the disappearance of the ice, *i.e.* 12,000

years ago, and it is probable that the first civilisation of that country (the Maglemose) was of the same age as the Azilian in France, which would make the date of the Transitional period about 10,000 B.C.

The beginning of the retreat of the last glacial period was some 17,000 years ago, and the Mousterian age straddled across this last glaciation. Between the Mousterian age and the date at which Man was first able to inhabit Scandinavia there is ample room to place the Aurignacian age (a long period), the short Solutrean epoch, and the fairly long Magdalenian age which, in France, was so startlingly artistic.

Having outlined our subject and described the conditions under which primitive Man lived, it will be our object in the next chapter to describe briefly the different Tools which he made. We shall then be in a position to study the various cultures in detail.

CHAPTER III

TOOLS

It has been already stated that the foundations of the study of Prehistory must be laid in Geology. The foundation stone of the subject itself is the typology of Tools. No excuse is therefore offered to the reader for a short chapter, which must necessarily be rather difficult reading. Only the main groups of Tools will be mentioned, and all small sub-divisions will be omitted; for these the reader should consult the writer's larger book, *Prehistory*. A study of Tools not only tells us something of the home life of prehistoric Man, but is also essential for a study of the movements of tribes and races whose cultures intermingled and modified each other. A careful study of the evolution of specialised Tools will often help us to determine how far the evolution was due to the development of a settled people, and how far due to outside influences. Originally, no

doubt, many Tools were made of wood or some other easily worked but perishable material; these have not survived, and it is only those Tools which were made of harder material which have lasted until to-day. What we have can only be a fraction of the former industries.

When we find that an invading race brings with them a more varied or a less varied series of Tools, all that we have the right to say is, that the new folk had superior or inferior industries in the particular material used. A race whose stone industries are rough and inferior, may have had a splendid series of Tools wonderfully made in wood; and, on the other hand, another whose stone industries were especially fine, may have hardly used the more perishable materials at all. We cannot affirm that in the first case the race was inferior in culture to the second. That wood was used for Tools from the earliest times is probable, as may be judged from a study of the bone implement found at Piltdown; the technique is that of wood work, the same as that used for the pointing of a stake.

Two main materials used for Tools have survived: (*a*) Stone or Flint, (*b*) Bone Antler, Horn, or Ivory.

Stone. — Stone was used at all times by Palæolithic Man when Flint was not available. It is seldom useful for the purpose of Tool-making, as it does not fracture well or evenly and does not lend itself to the manufacture of anything in the way of a delicate Tool. Stone is, therefore, practically useless for typological study. Flint, on the other hand, can easily be fractured regularly, and lends itself to the manufacture of delicate Tools: in the hands of a skilful man it is about as accommodating a material as could be desired, its only fault being that it is brittle in use, and therefore has to be used with care. The raw material is found in the form of nodules, and is especially common in chalk beds. The formation of Flint is rather obscure, and does not concern us here. Its chemical composition is silica with a certain admixture of water; the quantity of water in Flint varies, and when it is extracted from the ground a slow drying process takes place. The brittleness varies to a certain extent with the water content, Flint newly unearthed being more brittle than Flint that is seasoned by exposure to the air. The colour of Flint varies considerably, being sometimes black or blue, brown, red, or white, and thin sections

are more or less translucent. The colour may be due to the actual inclusion of coloured matter in the composition of the Flint, in which case, if it is fractured, the colour is found penetrating right through. Such is the case with the black Flint of East Anglia, or the honey-coloured Flint of Grand Pressigny. Or, as is often the case, the colour may be due either to the infiltration of iron oxides, producing a brownish or yellowish hue, or to the drying of the surface of the Flint leaving a crust of white silica. In such cases the colour is only skin deep, and forms what is called the patina. When, as in the case of the black East Anglian Flint, the black shows through a thin coating of the white, a bluish effect is produced.

Fracture of Flint. — Flint is fractured in three ways: — by percussion, by pressure, by changes of temperature.

Percussion. When a piece of Flint is struck by a hard round pebble, the actual point of contact is small, the force of the blow being localised at this point. To quote an article by the late Professor Hughes:

" The Flint pressed in and shattered, breaks in flakes so thick that the edges may be regarded as leaving a curved surface, which,

when the shattered part has been removed by the weather, appears as a shallow basin, while a conical nipple with an apex of (somewhere about) 110° often remains under the discoidal area when the action of the weather has not entirely removed this portion also. . . . If, however, the blow be sufficiently strong to break up the Flint, and we might regard the action of the hammer as punching out a portion of the Flint, then the nipple described above 'behaves with' the hammer, and drives out a conical mass which, if prolonged, would have an apex of 30°, so that the result is a long narrow cone truncated by a short broad cone with a more or less sharply-defined shoulder between the two. . . . If the blow be delivered on the margin of a flint a slice only of the cone on cone, or double cone, is struck off, producing a flake, a part of the truncating cone being seen in the bulb of percussion, some of the small discoidal surface of contact between the two elastic bodies being generally apparent. The direction in which the blow has been delivered is shown by the outward curve of the conchoidal fracture."

When, therefore, a flake is taken off, a swelling appears round the point of contact of

the blow, and a corresponding hollow is found in the core. It is only rarely that both cones are visible. The bulb itself, and the flake beyond the bulb often show parts of concentric rings that surround the point of contact of the blow, and correspond to the ripples produced when a stone is thrown into water; it is obvious, therefore, that if these concentric rings have survived we can deduce from them the direction from which the blow has been struck. If the blow has been intense, radial lines, emanating from the point of contact and at right angles to the concentric curves, are sometimes seen. In order to strike off a good flake from an irregular nodule it is necessary to have a suitable point of impact, whence the force of the blow, continuing on into the flint, will remove a suitable flake. Should such a suitable place or striking platform not occur naturally, prehistoric Man prepared one by taking off a few facets at right angles to the direction of his main blow. The resultant is known as a "facetted striking platform." A blow having been struck, and a flake removed, what is left is known as a core. Naturally many flakes can be removed from one core, and it is quite common to find cores in the deposits. If prehistoric Man made his

tools of flakes removed from a core, the tools are known as "flake tools." If flakes were removed from the core so as to leave the core the implement required, the tool is known as a "core tool." A Blade is only a fine flake with more or less parallel sides. A flake having been removed, further trimming is required in order to make a tool, blows being struck over the surface and at the sides to produce a trimmed edge. This is generally known as "secondary working." If a blow is struck at the edge, the implement being held in the left hand, and the striking tool in the right, and the direction of the blow is vertical or to the right, the force of the blow will proceed through the flint and emerge, and the edge of the facet, or flake scar, produced, will grade insensibly without any pronounced step or ridge, into the remaining surface of the flake. This is known as "feather-edge" flaking. If, however, the direction of the blow is inwards, that is, to the left the force of the blow will proceed into the flint, getting weaker as it continues in the denser material, till it finally gets no further. A little facet then snaps off and a definite step is produced between the new facet and the rest of the main flake. This is known as "resolved" flaking.

Pressure flaking. If pressure be strongly applied locally at a point a flake can be pushed off. A sort of bulb is often produced, but it is much flatter than the bulb of percussion. Pressure flaking was much used by prehistoric Man at certain definite periods to produce thin tools; these cannot readily be produced by the percussion method, as blows set up a general "shatter" in the material, and the result is a snap if the implement is at all thin. This difficulty is avoided by pressure flaking.[1]

Thermal fracture. Flint is a bad conductor of heat, and rapid changes of temperature produce differential strains in it, leading to "shattering." Thus, if flint be heated and then water dropped on it at a given point the result is a fissure. This method was seldom used by prehistoric Man, though it is frequently employed to-day by primitive peoples, and is one of the commonest forms of natural fracture.

Nature often fractures flint by percussion and pressure; thus, a river or sea will bang flints against each other; if one flint is held firmly in the ground, as in a vise,

[1] "Pressure flaking" is thus similar to the action of a knife cutting a pencil.

and the blows are in one direction, something of the nature of a definite "trimmed edge" will result. Again, gravels on a steep slope tend to descend gradually to the valley bottom, dragging the contained flints with them. This often leads to pressure flaking. Sometimes gravels containing flint rest on chalk, and a small area of the latter is removed in solution by underground water; the resultant collapse of the gravel drags down flints with it that pressure flake each other. Flints may be dragged down against another held firmly in the gravel to the right or the left of the localised collapse; this may often produce a definitely "trimmed edge." The reader can think out for himself many other methods by which Nature can produce flint fracture both by percussion and by pressure. Natural fracture by thermal action need not further trouble us — the results of frost, or of sun heat followed by rain are obvious causes. Thermal fracture sometimes produces a pitted surface or a flat one but with no bulb.

Bone, Horn, Antler, and Ivory. At certain periods prehistoric Man used these materials, which are obviously very suitable, for the making of delicate tools. The animals that he used for food furnished him with supplies;

thus, the great hairy elephant (the Mammoth), now extinct, supplied him with ivory, while reindeer and deer gave him an unlimited supply of bone and antler. Various methods were used for obtaining fragments suitable for the manufacture of special tools, and these, when important, will be dealt with in future chapters.

Flint Tools. — Tools tend to fall into families whose members are closely related to one another. Thus, we have the family of Scrapers, the family of Points, and the family of Chipped Stone Axes (Coups-de-poing). Certain types of each family persist through long ranges of time, and are found over wide areas. Others are more highly specialised and were only developed during short periods, by definite peoples, probably to fulfil a now unknown, but particular, purpose; some of these only occur locally, while others are widely distributed. In the latter case they become very important and may be called "type fossils" of the culture. Thus, a peculiar kind of graving tool, known as the "beaked" graver, practically only occurs in the middle of the Aurignacian period. If, then, an unknown deposit is dug, and these beaked tools found in quantity, we are

fairly safe in assuming a Middle Aurignacian date.

The important families of Tools are: —

Awls.
Chipped stone axes (Coups-de-poing).
Discs.
Gravers (Burins).
Levallois flakes.
Pigmy industries.
Points.
Rostro-carinates.
Scrapers.

Awls (*see* figure 3). Awls are made as a rule on flakes or blades, and are pointed by flaking, the point varying in size from that of a coarse needle to that of a thick awl.

Chipped stone axes (*see* figure 1). There are various forms of this tool. The finest are sometimes made by trimming both sides of large flakes, but usually they are made from cores. As a rule this tool is pear-shaped, narrowing to a point, with bevelled sides caused by the removal of flakes, so that while the centre is thick the tool has a fine edge; the fine oval ones are called " ovates." In some cases the sides of chipped stone axes show a curious S twist, usually to the right, as if they had been twisted when plastic. These

tools are exclusively of Acheulean age. In Lower Mousterian times there was a small heart-shaped chipped stone axe, triangular in shape and showing a small secondary flaking all round; some of the pear-shaped tools of this family instead of ending in a point end in a chipped edge.

Discs. These implements are round, or roughly squared with irregular edges, in some places heavily undercut.

Gravers (*see* figure 3). A graver is a more or less pointed tool, the distinguishing mark of which is a special facet known as a "graver facet." This facet is formed by a blow struck from the working edge of the tool lengthwise along the flint, the facet truncating the edge of the blade or flake. All genuine gravers bear the mark of this lengthwise blow, the direction of which can be identified by the presence of a negative cone of percussion at the working edge of the facet. There may be more than one of these facets, but at least one is necessary before the tool can be regarded as a genuine graver. Gravers fall into two distinct groups: —in the one the working edge is straight, like that of a screw-driver; in the other it is curved as in a gouge. They are therefore known as

the "screw-driver group" and the "gouge group." In each group there are various types distinguished from each other by the kind of workmanship found on the other side of the working edge. For example, the graver facet may be backed against another graver facet, or against a "trimmed edge" (angle graver). Gravers are found from the beginning of the Upper Palæolithic times till the dawn of the Neolithic era. Only one distinctive type of graver used need be described in detail, and that is the "beaked" graver. In appearance, this tool rather resembles the beak of a large bird, and has a series of convex graver facets up the beak. The working edge is convex and there is a single large graver facet on the under side of the beak. This tool is specially common in Middle Aurignacian times.

Levallois flakes (similar to illustration of ovate figure 1, but the under side is a flake surface). Levallois flakes are large flat, trimmed flakes, the trimming being on one side and the flake surface on the other. In appearance they rather resemble half an oval chipped stone axe which has been split sideways. It represents an ingenious method by which Man, especially Middle Palæolithic

Man, succeeded in making a large thin tool by percussion. The method employed is as follows: The tool required was blocked out on a core of flint, the top face being trimmed. The tool then stood out as a sort of oval ridge still attached to the parent core. One careful blow sufficed to remove the implement from the core, and the result was, on the one hand, the Levallois flake, and on the other, what is known as the " tortoise " core.

Pigmy industries. These industries are found in Upper Aurignacian, Upper Magdalenian, Azilio-Tardenoisean and early Neolithic days, but chiefly in Tardenoisean times. The tools comprise tiny blades and tiny knife edges of flint, sometimes with a curved, blunted back, so that the tool is shaped like a half moon. There are also pigmy gravers and scrapers and small flat triangles of flint with trimmed edges. Some of these little tools may very well have been hafted into a wooden frame like the teeth of a rough saw. Some of the pigmy blades of late Magdalenian times have toothed edges.

Points (*see* figures 1, 2, 3). Points form a large and varied family, some of which are very similar in appearance, whilst others differ greatly. They may be divided into the Mousterian point, the Aurignacian series of

points (or rather pointed blades), and the Solutrean pressure flaked javelin points. Mousterian points are almond-shaped tools pointed at the end, made on flakes, with the same method of trimming as is found on side-scrapers. They are characteristic of the Mousterian age, and as is the case with all tools of this age they often have a facetted butt, and "resolved flaking" is the rule.

The Aurignacian Points of different dates vary in shape. The Point was really a knife blade pointed at the end; at first, it was merely a flake struck off a flint, the edge sometimes trimmed and the back blunted, so that it could be conveniently held in the hand. In Lower Aurignacian times Points were asymmetric, small and fine; in the Upper Aurignacian age the tool was narrower, more symmetric, the blunting running right down the back more or less parallel to the knife edge. At the end of Aurignacian times a tanged point appears, known as a "shouldered" point. This may be single or double.

Solutrean "laurel-leaf" and "willow-leaf" points (*see* figure 3, "willow-leaf"). These are pressure-flaked and shaped like leaves, being thin and usually pointed at both ends. "Laurel-leaves" are trimmed on both flat

faces; in the case of "willow-leaves" one face is a flake face.

Rostro-carinates. This tool is in shape like the bow of a boat, keel uppermost, with sharpened and beaked prow. The under side is flat and the upper side has a raised dorsal ridge; and the tool roughly resembles a solid claw.

Scrapers (*see* figure 12). The large tribe of Scrapers can be divided into four families. Their use was probably to remove fat from skins, etc., in the preparation of clothes, though many other purposes also suggest themselves: (1) Mousterian side scraper. An edge of a large flake is carefully trimmed into a slightly convex form with little "resolved" flakes; the resulting sharp convex edge would be very suitable for skin scraping. (2) Scrapers on the ends of blades. These occur at all periods from Upper Palæolithic times onwards, and consist of a blade with sharp convex end, produced by careful trimming. The number of sub-types is legion. (3) Scrapers on flakes. The same as No. 2 but more irregular, as the basis consists of rough flakes and not regular blades. (4) Core-scrapers. If small flakes have been taken off round a flint core which is then split in half, the result is a flat undersurface, with a

convex and sharp edge, on the other side of which are flake scars running up the core. A particular variety is the keeled-scraper, in which great care has been taken to make the convex working edge regular, and where the little flakes taken off the core are narrow and flat, more or less fan-shaped, and run up to a sort of keel. This tool is fairly typical of Middle Aurignacian times.

Bone, Antler, Horn, and Ivory Tools. Tools in these materials are as a rule much simpler than those made in Stone. The following families occur:

Harpoons.
Lance-points.
Needles.
Polishers.
Sceptres (so-called).
Spear Throwers.
Wands.

Harpoons (*see* figure 4). Harpoons form an important family, as they only occur in certain eras and change their form very rapidly. The earliest kind of Harpoon shows a stem with the suggestion of barbs on both sides. At the next stage we get well-made barbs but on only one side of the stem. Then followed double barbed harpoons, the well-detached barbs

being either opposite or alternate. At a slightly later date the barbs of these double-rowed harpoons, instead of being nicely curved, became angular. These harpoons only occur in Middle and Upper Magdalenian times. Those found in France show a swelling at the base of the harpoon, which would make it easier to attach the harpoon to a line or shaft. Those found in north Spain have a definite side swelling at the base of the stem pierced with a hole. Reindeer bone or antler was used to make harpoons by Magdalenian Man; in Azilian times stags' antler was used, the harpoons were flatter, the barbs very angular and but little detached, and there is a hole in the middle at the base of the stem.

Lance-points (*see* figures 2, 3, 4). There are various kinds of lance-points, for details of which the student must consult larger works. Only three varieties will be mentioned: (1) Plain lance-points; consisting of a pointed bone with or without a bevel or bevels at the upper end for attachment purposes. (2) Split base bone points; these are typical of Middle Aurignacian times and consist of a rounded piece of bone, pointed at the end, and split longitudinally at the base for a short distance for attachment purposes. (3)

Forked base bone points; these only occur in Magdalenian times. Their general appearance is similar to No. 2, but the base, instead of being split, has a notch carefully carved. The reader should distinguish carefully between Nos. 2 and 3, as they belong to very different ages.

Needles (*see* figure 4). Little needles of bone are found sometimes eyed, sometimes not; they vary in size from a boot-maker's needle to a thick darning needle. They are practically confined to Magdalenian times; the eyes are pierced by very fine flint awls, specimens of which have been found.

Polishers. One end of a piece of bone is carefully rounded and flattened to form a sort of spatula. In Aurignacian and Azilian times the raw material for the tool was obtained by splitting a bone lengthwise. In Magdalenian times an ingenious method for getting a flat piece of bone for the tool was often used. Two lengthwise grooves were cut in a piece of bone, and with a carefully directed blow the strip of bone between them was struck off.

Perforated bone staves (batôns de commandement). These strange objects first appear in Aurignacian and vanish at the end of Magdalenian times. Their use is unknown;

it has been suggested that they were arrow straighteners, or for making a thong of reindeer hide pliable, or brooches, or, when highly decorated, Sceptres. In their simplest form they consist of a portion of a reindeer antler pierced with one or more holes (sometimes round, sometimes oval), the edges of which often show marks of abrasion. In later Magdalenian times they are often profusely and wonderfully decorated with engravings (*see* figure 7).

Spear Throwers. These were used for projecting lances. They consist of a long handle of bone with a spike-like projection at the top end. The stick was often sculptured in the form of an animal. The lance being laid on the throwing-stick (the end being applied to the spike-like projection) a jerk is given to the stick, and the lance is projected with some considerable force (*see* figure 7).

Wands. These rods, carefully rounded and pointed, and often finely decorated, may have had many uses but are vaguely classed together as Wands.

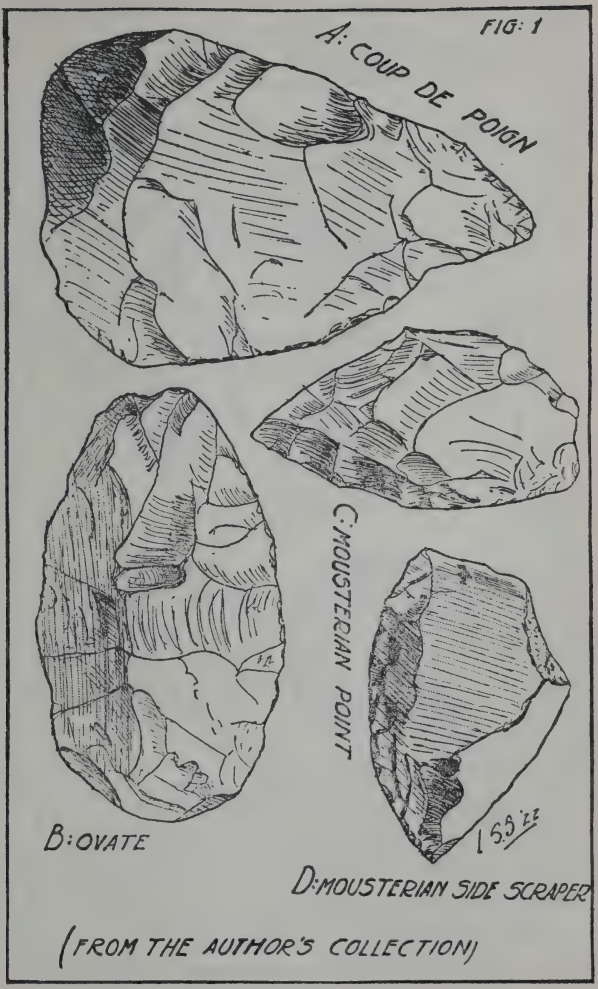
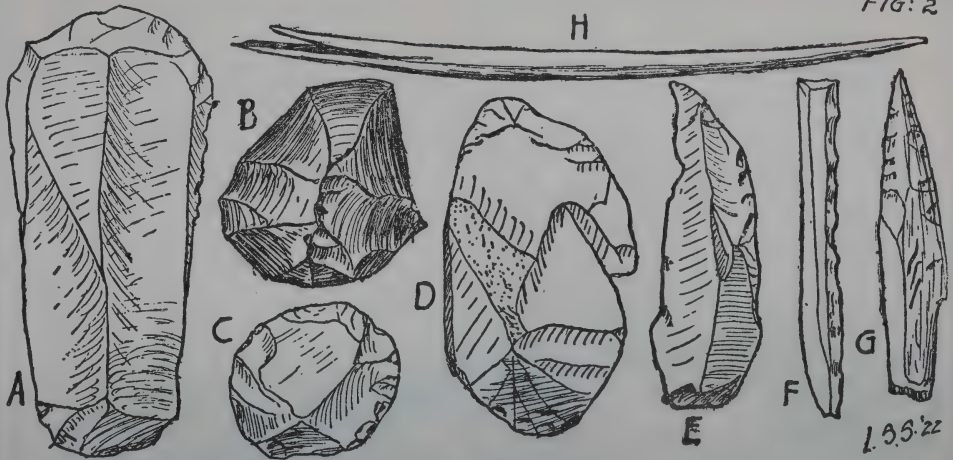


FIG: 1
A: COUP DE POIGN
C: MOUSTERIAN POINT
B: OVATE
D: MOUSTERIAN SIDE SCRAPER
(FROM THE AUTHOR'S COLLECTION)

FIG: 2



A.B.C.D DIFFERENT KINDS OF SCRAPERS
E CHÂTELPERRON POINT
F GRAVETTE POINT
G SOLUTREAN SINGLE SHOULDER POINT
H SPLIT BASE BONE POINT

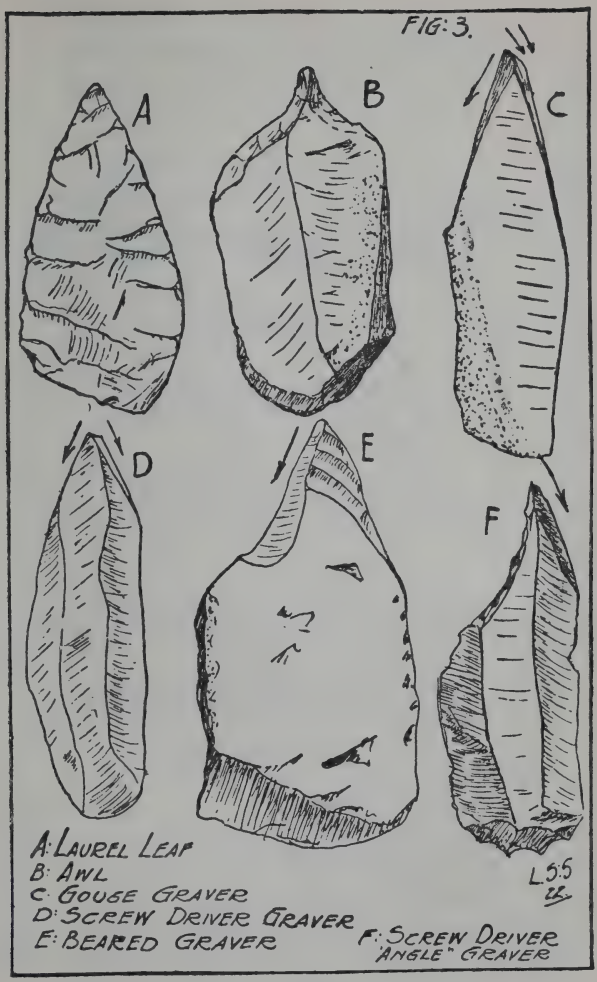


FIG: 3.
A
B
C
D
E
F
A: LAUREL LEAF
B: AWL
C: GOUGE GRAVER
D: SCREW DRIVER GRAVER
E: BEARED GRAVER
F: SCREW DRIVER "ANGLE" GRAVER
L.S.S.

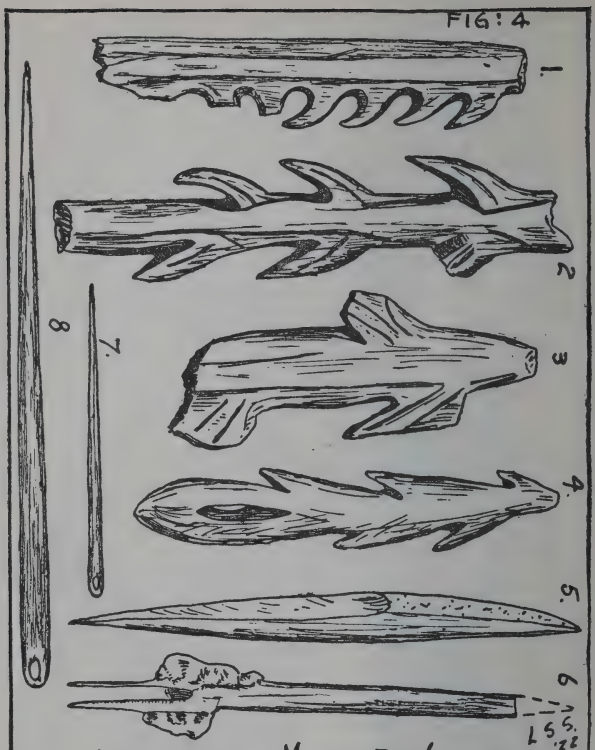


FIG: 4
1.
2
3
4.
5.
6
7.
8
1-4 HARPOONS OF MAGD. 5&6 AND AZILIAN AGE
5. SINGLE BEVEL LANCE POINT
6. FORKED BASE BONE POINT
7-8; A LARGE & A SMALL NEEDLE

CHAPTER IV

EARLIEST HUMAN CULTURES TO THE END OF THE LOWER PALÆOLITHIC AGE

THE probable origin of Mankind has already been vaguely indicated, and we have seen that it is exceedingly difficult to draw a hard and fast line between the highest type of animal and a low type of human. Seventy years ago all scientific and theological thought was antagonistic to the idea of Man's existence previous to the Great Ice Age. This is no longer the case, and his tools have been found in Upper Tertiary deposits. But the presence of chipped flints is no absolute proof that Man existed, for the question is always arising as to whether certain flints were chipped by Man or by Nature. This has given rise to the Eolithic controversy which has raged since 1867, and of which the last word has by no means been heard. The problem therefore resolves itself into the question as to whether Nature *could* have chipped cer-

tain rough flints found in deposits of Tertiary Age. This question has a special interest for English people, owing to the existence of sandy Upper Tertiary deposits in East Anglia, where certain chipped flints have lately been found, a discovery which has converted some of the leaders in prehistory, such as the Abbé Breuil, to a belief in the existence of Upper Tertiary Man.

The whole problem was first raised by the Abbé Bourgeois in 1867, at the Congress of Paris. The Abbé had found chipped flints in beds of Upper Oligocene Age (that is of Lower Tertiary date), near the village of Thenay, south of Orleans (Loire et Cher). He was convinced that the chipping was the work of Man, and he carried some of his hearers with him, though they were by no means all convinced. A few years later somewhat similar objects were found near Madrid. They date from the beginning of the Upper Tertiary (Miocene) times, which was a period of earth movement in Europe when mountain masses, such as the Alps, were upraised. 1877 saw the discovery by Rames of more eoliths (also of Miocene age) at Puy-Courny and Puy-Boudiou in the department of Cantal (Auvergne). From 1889 onwards,

Mr. Harrison found a large number of these objects in the plateau gravels near Ightham, in Kent; these were, and still are, accepted by some people as being of human workmanship. Nothing further happened until 1905, when M. Boule published a long article in *l'Anthropologie,* demonstrating that the chipping on the so-called eoliths could all be explained by natural causes. His main argument was that stream action produced just such definite chipping by the rolling of one flint against another. If one flint is held in position, then the chipping on it becomes regular, as all the blows are necessarily struck from one direction, that of the flow of the stream. His statements were based on observation of a large mortar-making machine near Paris, which to a certain extent imitated this stream action in a concentrated form. The Abbé Breuil followed with a paper showing that very wonderful results could be produced in tool-making by the pressure caused by differential movement in gravels containing flints. This differential movement is often caused by partial solution of underlying chalk, and the consequent collapse of the gravels above. Excellent examples of these have been discovered lately by

H. Warren in the so-called "Bull-head" beds, not far from London. The pseudo-implements which H. Warren has collected, made by this kind of pressure flaking, are really most remarkable. Flints apparently chipped by Man were described from Boncelles in Belgium, but it was finally decided that natural agency was a sufficient explanation for them.

In 1910, R. Moir, of Ipswich, found many of these eoliths in "crag" from local pits of definitely Pliocene age, and he defined a new type of tool called "rostro-carinate. His finds were studied by MM. Boule and Breuil, who denied that they proved human agency. All sorts of explanations were adduced to show how these flints had been chipped, and amongst others the motive force of ice action. It was suggested that a typical "rostro-carinate" had been formed from a disc of flint with a natural chipped edge, the upper third of which had then been broken off, the broken face thus forming the flat under surface. Breuil had previously asserted that many of the facets showed different patina, and were therefore of different date, and thus the finds of Mr. Moir were rejected. Moreover, the flints had been found in marine

beds, beds laid down by the sea in shallow water, and Professor Sollas showed a number of specimens from the sea beach with similar chipping, due to the sucking back of stones by sea waves, when flints are hurled against other flints held stationary. Undaunted by this criticism, Mr. Moir started fresh diggings at Foxhall. Here the deposits consist of sands, and the included flints are few; there was, therefore, no question of natural chipping by pressure flaking, due to differential movement, as the flints strewn sparsely through the sands would rarely have been in contact with one another. The chipped flints were usually found in two layers or floors, the upper one of which was by far the richer. Finally, a number of small delicate tools and flakes were found which could hardly have withstood any very violent natural action. Nature can chip by pressure or by percussion, either in one direction or all over the flint: it depends whether the flint has been held as it were in a vise, and blows rained on it from one direction only, or whether it has been freely moving round and has battered itself against other solid objects. It is conceivable that if the direction of the blows altered, or the flint was turned round, the

chipping might occur along two different sides, but this is hardly likely. If, however, an eolith is found consisting of a blade or regular flake definitely struck off by a blow, shown by a bulb of percussion (still more so if the platform shows signs of a certain preparation by facetting), and then an edge is trimmed by a series of small blows running along one side of this blade, it is hardly credible that this is Nature's work. Further, the argument that the trimmed edge was produced by the pressure of stones nicking out facets, is untenable in the case of some of the Foxhall specimens, for small stones or other hard agents dragged over the surface of the flint would leave scratches in their passage across, and there are often no signs of this.[1]

In the presence of the Foxhall finds, M. Breuil, who had been one of the chief opponents of the belief in Upper Tertiary Man,

[1] Two further factors should be remembered by the student looking for worked flints on the surface of the ground; the first is, that on roads, etc., flint has often been broken by Man to form road material of suitable size, or, if not by the stone-breaker, by cart wheels; on the surface, too, thermal action has to be reckoned with, the pitted surface often seen on flint being due to fracture consequent on rapid changes of temperature. None of these surface phenomena are applicable to flints found deeply buried in deposits of definitely known age.

unhesitatingly admitted that there was clear evidence of at least a tool-making animal, and announced his conversion on this point at the Anthropological Congress at Liége in 1921. M. Breuil's remark to the writer, after seeing Foxhall: "Mon cher, cela vieillit beaucoup l'Humanité!" was epoch-making for this branch of the subject, since it meant that the orthodox prehistorian has now to reconsider his ideas on the age of the human race, allowing it a much earlier birth date.

Not every prehistorian is yet convinced, and there are some like Mr. H. Warren (who has a very specialised knowledge of the fracture of flint), who still claim that the Foxhall finds can be explained by natural causes, and that they are not made by Man. Nevertheless, belief in the existence of Tertiary Man, an existence which has been long inferred by the biologist for evolutionary reasons, is gaining ground.

If the presence of Man is demonstrated in any particular layer, the prehistorian need not be so critical of each specimen found in that layer, but he should be sceptical and not accept all rough chipped flints as man-made. Perhaps, too, some of the earlier eoliths, such

as those of Puy-Courny, will have to be reconsidered.

Lower Palæolithic and Prepalæolithic. The Lower Palæolithic age comprises the Acheulean, Chellean, and Pre-Chellean cultures. An attempted correlation of these cultures with the geological record has already been made, in which the Acheulean period coincides with the latter half of the Riss Würm inter-glaciation; while the Chellean occurs at the maximum of the Riss-Würm interglaciation, though some refer it in part to as early as the Mindel-Riss inter-glaciation; and the Pre-Chellean occupies the rest of the time back to the end of the Tertiary period. This period is not so long if we accept M. Boule's three-fold glaciation. The implements in these early ages consist almost entirely of chipped stone axes (coups-de-poing), with very occasional scrapers and awls. The Pre-Chellean chipped stone axes are very roughly made, but show improvement in Chellean times, though the sides of this pear-shaped tool are zigzag owing to the lack of skill in trimming, and the natural crust of the flint is often left on the butt of the tool. In upper Chellean times a well-made pointed chipped stone axe was evolved.

The problem of hafting has given rise to much controversy. Chipped stone axes were probably used for many purposes, for some of which they may have been hafted by being bound to the end of a stick by a thong.

Attempts have been made to divide the Pre-Chellean period into various stages (Strepyan, Mesvinian, etc.), but more knowledge of the subject is required.

The Fauna found in conjunction with implements of Pre-Chellean times includes a very early form of elephant (*Elephas meridionalis* [1]) and rhinoceros (*Rhinoceros etruscus*). In deposits of Chellean age are found the bones of warmth-loving animals such as *Elephas antiquus* (a species allied to the modern African variety), *Rhinoceros merchii,* Hippopotamus, Sabre-toothed Tiger (*Felis machairodus*), which became extinct in these times, Cave Lion, Cave Hyæna, Cave Bear (*Ursus spelaeus*), Brown Bear (*Ursus arctos*), Giant Stag, Giant Deer, Red Deer, Horse, etc., etc., and a well-known Mollusc *Corbicula fluminalis.* There were also trees like the Canary Laurel and the Fig Tree.

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[1] Prepalæolithic industries, it is affirmed, and bones of *E. meridionalis* have been found at Torralba, province of Soria, Spain.

In Acheulean times the Fauna included the Mammoth, the Woolly Rhinoceros and the Bison — all cold-loving animals.

A special word must be said on the Acheulean culture, for not only does it show a big advance in skill over the earlier industries, but we find an immense number of implements of this date. The ordinary pear-shaped chipped stone axe is much more finely made, no crust being left on the butt, as was common in Chellean times, and the edges instead of being zigzag, as they were in earlier days, are now chipped straight and sharp. There is also a tendency to flatten out the round-pointed end for about a third of the length of the tool. A new distinction is the S-shaped twist of the side of the tool, when the top half has a twist, usually to the right. Some writers consider that this was not intentional, being merely due to the way the tool was chipped; others have thought that it was intended to give a gyroscopic motion to the tool when thrown, to ensure a straight throw. This seems hardly likely, for the weight of these twisted tools is quite considerable, and Man has not much force of projection at his command.

The Acheulean period is divided on strati-

graphical grounds into three periods: — Lower, Middle, and Upper; there is also a certain change in implements for, with the advent of the Middle Acheulean times, the "ovate" appears in profusion. This tool is an oval chipped stone axe, a simple derivative from the ordinary type. These "ovates" are of all sizes, from very large to very small; some of them beautifully made with fine feather-edge flaking. The edge of the tool is often quite sharp, though generally much more so along one edge; the S-shaped twist is also found on them. They are quite common in England, great stores of them occurring in some places, as for instance in a bed of gravel not far from Reading, where hundreds were found close together. Although these Acheulean "ovates" are chipped all over, and are thus true Chipped Stone Axes (coups-de-poing), they were sometimes made from large flakes which have themselves been chipped all round.

In Upper Acheulean times we find the arrival of the "Levallois flake" industry (which may possibly have been a Mousterian importation), and also that of the La Micoque industry. The La Micoque chipped stone axe is small, triangular,

and like a lance-point, the flake surface being sometimes left untrimmed; there are besides knives and awls. La Micoque is a small rock shelter near Les Eyzies, and it is perhaps a mistake to consider this industry of more than local importance. Mousterian influences were probably already affecting Upper Acheulean conditions. Hitherto in Dordogne (this is less true of northern regions) the bones of Reindeer have not been found in the deposits, but from now onwards they appear, and the layers are classed as Mousterian.

The Lower Palæolithic people seem to have come from North Africa, though this was probably not their birth-place; they can hardly have come into Europe from Asia, as a broad gulf stretched down from the Arctic Sea to the Caspian. Chipped stone axes of Lower Palæolithic type have been found nearly everywhere. They occur in Africa, India, and it has been asserted, though doubtfully, even in America (Trenton). It is not always possible to correlate the gravels in which they are found exactly with those of Western Europe, and it is very dangerous to argue similarity of age, or even of culture, from the similarity of a universal sort of tool

like a chipped stone axe (coup-de-poing) which, after all, is little more than a third hand, made of stone, able to do certain work too hard for the human hand. Chipped stone axes are rare in Germany, and hardly occur in Belgium except on the French frontier, which no doubt was influenced by the people of the Somme valley, where stone axes are found in profusion. No bone tools of Lower or Prepalæolithic age have been found with the exception of an elephant femur roughly pointed and of uncertain date, discovered at Piltdown (Sussex); the pointing is similar to the sharpening of a wooden stake.

CHAPTER V

THE MOUSTERIAN PERIOD, THE AGE OF NEANDERTHAL MAN

THE cool, dry period of Acheulean times was followed by the Arctic climate of the Würmian glaciation, and simultaneously Mousterian Man invaded France. He probably arrived from South Germany, and by the time he reached Dordogne in the south-west of France, his culture had, to a certain extent, become merged in the Acheulean culture, which flourished in Dordogne. Thus, it is not always easy for those who are digging in Acheulean and Mousterian deposits in the Dordogne, to draw a hard and fast line between the two cultures solely from an examination of the industries. So much is this the case that even M. Peyrony, of Les Eyzies, who has done more digging around Les Eyzies than anyone else, makes the arbitrary rule that if Reindeer bones are found in a deposit then a Mousterian date is assigned; if they are absent, then the layer is classed as

Upper Acheulean. This does not mean that we have proof of definite transitional times when the Acheulean was developing into Mousterian; on the contrary, all the evidence points to an invasion of Western Europe by a new race, possibly even lower in the scale of humanity than the earlier Acheuleans. The early arrivals of the Mousterian race in Dordogne adopted, to a certain extent, the Acheulean type of tool, though inclining rather to make it in their own peculiar way. Thus we find that the earlier Mousterian industries of France have yielded quantities of chipped stone axes (coups-de-poing). This type of tool disappears in typical Mousterian times when Neanderthal Man completely occupied France, the Acheulean people being either absorbed or exterminated.

The following peculiarities of the Mousterian industry are to be noted. Firstly, for the first time, the large majority of implements are made on flakes, and not from cores, which often involved the use of a facetted striking platform for removing the flake which was to be transformed into a tool. Secondly, "resolved," or "stepped" flaking was the rule. Thirdly, the "Levallois flake" technique, which was specially frequent in

Early Mousterian, and is even found in true late Acheulean times. Fourthly, there is the occurrence of a monotonous series of side scrapers and Mousterian points. Fifthly, the appearance, not of bone tools, but of so-called " utilised bones," which were generally the small leg bones of a bison or horse and show marks of bruising and scratchings. The exact reason why these were made is still uncertain, but it has been suggested that the softer bone material would be very useful as an anvil in the chipping of large flakes. Large rounded balls of stone are occasionally found, the use of which is unknown, though it has been suggested that the small ones were the ammunition for slings, and the large ones for bolases. This is a mere guess, but it is a serious problem to determine how prehistoric man managed to kill the large game such as the Mammoth and Rhinoceros. No doubt wooden weapons were used, and the animals were caught in traps or in pits cunningly concealed in the ground, but, even so, the despatch of these huge beasts with their thick hairy skins must have been no light undertaking.

Three main sub-divisions have been suggested for the Mousterian period: — Lower, Typical, and Upper.

The Lower, which is well represented in the Lower rock shelter of Le Moustier, includes, as has been said, chipped stone axes as well as the other more typically Mousterian tools. These chipped stone axes are usually smaller, neater, and more elegantly made than those of Acheulean date; the S-shaped twist of the sides, so typical of Acheulean times, is absent, and the general shape is triangular or heart-shaped, the base being often definitely concave. The side scrapers and points tend to be large and not so elegantly made as at a later date.

The Typical Mousterian contains few chipped stone axes, but we find a monotonous series of points and side scrapers with a number of " Levallois " flakes which survive from Lower Mousterian times. The older layers of the upper rock shelter at Le Moustier represent this period very well.

In the Upper Mousterian, which is well studied at the rock shelter of La Quina (Charente), there are a very dull series of finely-made small side scrapers and Mousterian points. There is very little variety in these tools.

This Upper Mousterian is in turn succeeded by the so-called Transitional layers,

which are not to be considered as showing an evolution from the Upper Mousterian to the Lower Aurignacian, but rather as typical of a time when new influences are entering the Mousterian world from without. The transitional industries will be considered in the next chapter, dealing with the Upper Palæolithic, though it is a moot point whether they were made by Neanderthal Man under the influence of new cultures trickling in, or whether they were due to forerunners of the succeeding Upper Palæolithic people living amid Mousterian surroundings.

A number of other tools occur all through Mousterian times, though they are much rarer, as, for example, the awl and the scraper; the fact that strikes the excavator in — say, the Upper rock shelter of Le Moustier — is the immense number of untrimmed flakes that occur profusely all through the layers. Dordogne must have been a very popular area all through Palæolithic times, for natural flint is exceedingly common there.

The Mousterian industries are usually found associated with an arctic fauna, though not invariably, as there are implements of that age found with a more warmth-loving

fauna, which, if found alone, would be classed as Chellean or Acheulean. The most important locality demonstrating this is the Grotte du Prince, Mentone; and a theory has been put forward, which is still accepted by some, that the warm fauna was a real survival of Chellean times that continued to exist in those favoured regions to which to-day the inhabitants of northern climates fly to escape the rigours of winter. This explanation was all very well as long as the "warm" Mousterian was only found on the Riviera, but when similar finds were made in the Amiens district by M. Commont, it was seen that another explanation was necessary. It was then found that this "warm" Mousterian was older in date than the typical Mousterian; although its relation in date to the Acheulean could not be accurately determined owing to the fact that the cultures are never found in contact. In order to provide an explanation two other facts must be considered. The first of these is the rarity in Germany and Belgium of the Lower Palæolithic chipped stone axe industries that are so common in England and France. In Belgium, indeed, they only occur near the French frontier. At Taubach, in Thuringia,

on the contrary, we have deposits with what seem to be very distinctly Mousterian industries, and yet with a fauna apparently Chellean. One must also remember the Mauer jaw found near Heidelberg, and described in detail in the chapter on prehistoric human remains. It is sufficient to say here that this jaw strongly suggests a massive early Neanderthal type. The writer remembers M. Cartailhac, the veteran prehistorian, who died in 1921, taking a cast of the Mauer jaw and fitting it on to the Mousterian Chapelle-aux-Saints skull, and an extraordinarily good fit it made! The geological date of the Mauer jaw cannot be later than Chellean times, and is probably a good deal earlier. Unfortunately, there is little evidence to show what Chellean and Acheulean Man was like, unless we can take the Piltdown skull as an example; but this, at any rate, is totally unlike Mousterian Man. Are we to consider that the Neanderthal race developed somewhere in what we should now call south Germany, perhaps from the earlier Chellean species? or if they were not actually developed in these areas that they migrated to them and sojourned there during the late Chellean and Acheulean times of France and England?

Later, possibly under the influence of the oncoming Würmian glaciation, which must have been especially intense in the German plains and in the vicinity of the Alps, they would be forced to quit, and apparently proceeded to overwhelm the French Acheulean culture. Under these circumstances the "warm" Mousterian may well have been merely a foretaste, in earlier times, of what was to come; similarly, if the "warm" Mousterian of Mentone was not due to a survival of warmth-loving animals in those sheltered regions, it may have been the result of an earlier migration from the plains of Central Europe following a southern route to the south of the Alps.

As is often the case in these prehistoric problems more discoveries are needed, but it is this very lack of knowledge which is one of the chief interests of prehistory, because any day new discoveries may force modifications of the orthodox theories, and further, these important discoveries are not reserved for the specialist alone, but may be made by any lucky amateur who intelligently and systematically explores deposits in the vicinity of his home, in his spare time. The one essential, necessary to ensure that a dis-

covery shall be of real use, is to know the exact horizon and the exact conditions under which each object is found.

The distribution of Mousterian cultures is still imperfectly known; they are found in France, Belgium (sometimes of rather peculiar type[1]), England (especially in the Thames valley), Germany, Italy, Spain (both in the north in cave deposits, as well as in the south in open stations), and in North Africa. Here they seem to have lingered in the hinterland of the Mediterranean coast for a long period, and to have evolved some peculiar tools, notably a sort of tanged Mousterian point. One or two examples of this type are known in Europe, in France, and at S. Brelade's Bay, Jersey; but they are most rare.

Neanderthal Man seems to have been a step backwards in the evolution of the human race as regards intelligence and cultures. His tools, though finely made, do not reach the Acheulean standard, and in many ways

[1] In Belgium the rough industry called Mesvinian may possibly indicate a Proto-Mousterian culture. Besides this there are two series, the one, comprising Mousterian tools of the regular French type, is found, in caves; the other includes a number of peculiar tools such as long stone picks chipped all over, and is found in open stations.

exhibit very little variety. We are still dealing with a race far removed in the scale of Humanity from ourselves, but the succeeding people, to be described in the next chapter, are of a very different type; and here we greet for the first time *Homo sapiens*.

CHAPTER VI

UPPER PALÆOLITHIC CULTURES

As the intense arctic conditions of the Würmian glaciation began to pass away, the climate of a great part of Western Europe became not dissimilar to that of the Siberian "steppe" to-day. The same conditions did not prevail over the whole area, any more than they do in modern times, and near large mountain masses, where big snow-fields still persisted, the conditions remained far from pleasant. The summers were short and hot, though the winters were still long and severe. The oak and sweet chestnut flourished.

Mention has been made of new types of tools appearing in the uppermost Mousterian levels; this is the case in many of the French sites, notably in the upper rock shelter of Le Moustier (Dordogne), and the uppermost layer of La Quina (Charente). Such occurrences are in some instances due to admixture of adjoining layers of a really different

date; but these new types, found in the Upper Mousterian layers, show, from their number and their patina, that they are contemporary with the surrounding Mousterian implements. All the evidence goes to prove that the Upper Palæolithic civilisation was in no sense of the word a derivative from the older Mousterian. The physical structure of the skeletons shows this clearly enough, for there is no connection between the older Neanderthal folk, and the succeeding Neoanthropic (often called Cro-Magnon) type. The origin of these Upper Palæolithic people is therefore a matter of some little interest.

It is not always easy to tell exactly from which direction a migrating folk have come, and still less easy to determine the cradle of their culture. The best way is to search for areas where deposits containing very primitive industries of the new culture are largely developed. It is then fairly safe to say that a line of migration has existed between these areas and places where deposits which contain much less primitive industries of the same culture are found. This is further demonstrated if these later and less primitive industries include types of tool that can be shown to be later evolutions and modifica-

tions of earlier and more primitive types found in the areas from which it is suggested that the migrations started. Very primitive Upper Palæolithic industries are found in North Africa, and it is suggested, probably with a great deal of truth, that it was the starting place from which Upper Palæolithic Man invaded Europe, probably in successive waves of migration entering by the land bridges of Italy and Spain. Certain it is that by the time we reach east Central Europe far from North Africa, no very early Upper Palæolithic industries are found. Whether North Africa was itself the cradle of this new people is more than doubtful; except for the Egyptian civilisation of later times (which itself is in the extreme east of Africa), this continent appears to have been more a museum than a cradle. The extensive Mousterian civilisation in the hinterland of the Mediterranean coast, mentioned in the last chapter, and which it would seem occupied a wide belt running from Egypt to at least the longitude of southern Algeria, would have restricted the areas of Upper Palæolithic Man in North Africa to a comparatively narrow corridor following the Mediterranean shore. Up to the present his

industries (called in Africa Capsian) are not found further than about two hundred miles or so from the coast.[1] It seems likely that he entered Africa, as so many other races have done, from the east by the Egyptian gate. We do not know the exact cradle of this interesting race, but fuller investigations in the Mesopotamian area and further east may throw more light on this subject.

The Upper Palæolithic industries are totally different from the early Mousterian ones. The dull series of side scrapers and Mousterian points disappear, and their place is taken by an extraordinarily varied collection of flint tools. Implements are usually made on blades rather than on flakes, and are therefore much neater in appearance; and, where larger lumps of flint are used, the practice of "fluting" is common, the little facets removed being long and with parallel sides. A bone industry that culminates in the very finely made tools of later Magdalenian times appears for the first time.

At one period (the Solutrean) the use of pressure-flaking is introduced, enabling tools

[1] There is certain evidence that a small branch migrated south, reaching what we now call Kenya Colony, for obsidian implements of this style have been found at Naivasha.

to be made very thin for their size. This technique died out, but was probably not forgotten elsewhere, for we get it again in a very flourishing form in Neolithic times. This may have been merely a re-discovery, though it seems unlikely that so useful an art should have been completely forgotten.

In France, the so-called Transitional industry on the top of the Mousterian is referred to as the Audi stage, named after a small rock shelter near Les Eyzies, where the tools of that age are well represented. The typical tool is a so-called "Audi point" or knife blade. This is a short broad blade sharp on the side of the working edge, but with the opposite edge carefully curved and blunted so as not to hurt the hand of the user. Side scrapers and end scrapers are still found as well as a few chipped stone axes (coups-de-poing), one or two gravers and some small bone tools.

The Upper Palæolithic age is divided into four main cultures: Aurignacian, Solutrean, Magdalenian, and Azilio-Tardenoisean. The last of these cultures will be treated of separately in the next chapter, as it is concerned with the Transitional period and the

entrance of the new Neolithic culture into Western Europe.

Aurignacian. This culture, which stratigraphically is found in deposits covering and therefore newer than the Mousterian, but covered by, and therefore older than layers of Solutrean age, is named after a small cave Aurignac, in the Pyrenees, in which this industry was well represented. Various subdivisions of this culture have been made, partly based on a study of the evolution of the tools, but more particularly on the stratigraphical sequence of the industries. The early or transitional age has already been discussed; this is followed by a Lower, a Middle, and an Upper Aurignacian. The Lower Aurignacian corresponds exactly to the Capsian industries of North Africa, from which it was no doubt derived. The typical tool is the "Châtelperron point," or knife blade, which is similar in shape to the Audi point, though smaller and more skilfully made. The blunting along the back is made by the removal of small neat flakes, which is a very different workmanship from the rough battering used in the blunting of Audi points, when the flakes removed were much larger and more irregular.

The Lower Aurignacian, in Europe, is a comparatively small industry which did not last any considerable time, but gave rise, in Western Europe, to the long and exceedingly flourishing Middle Aurignacian era. At no other time did Man so skilfully chip flint implements into a bewildering number of forms as he did during this age in France. Nothing corresponding to the Western European Middle Palæolithic skill is found in the Capsian industries of North Africa, and it would seem that the occupation of new areas (more particularly in France) gave the impetus to this flourishing culture. The typical tools are the keeled scraper (with its carefully made thin, flat, narrow fluting running fan-shaped to a sort of keel); the beaked graver, which is practically identical, but made on the thickness of a blade or flake; and the bone tool with a split base bone point. All the multitudinous varieties of gravers are found, as well as awls of different sizes, a large coarse kind being known as "tap-borers." These at first sight faintly recall the chipped stone axes, but the technique is totally different, and the true chipped stone axes have long ago disappeared completely.

The Middle Aurignacian is succeeded by the Upper Aurignacian, which could hardly be derived from its forerunner, though very similar to the Upper Capsian industries which have been slowly developing. It thus seems probable that it was a second influence coming from North Africa affecting Western Europe. The Upper Aurignacian folk did not make such a variety of tools as did the Middle Aurignacian people. The "beaked burin," "keeled scraper" and split base points grow fewer in number, and the unsymmetrical "Châtelperron point" develops into the more symmetrical "gravette" point or knife blade. That it was intended to make a knife blade rather than a point is clearly shown, for some of the "gravette" points have squared ends. Gravers are very common and usually rather long, but the tool most characteristic of these times is the "shouldered" point which appears at the end of the Upper Aurignacian. There are two varieties of shouldered points; in one a single notch produces an unsymmetrical tang, and in the other type two notches form a symmetrical tang. The latter is known as the Font Robert Point, from a rock shelter of that name in Corrèze, France.

The Aurignacian culture reached Eastern Europe, and seems there to have developed a centre which probably continued to the end of Upper Palæolithic times. This development was on rather different lines from that of France, and we find a very different decorative art. A number of caves in south Poland have been excavated, but further work is required. The decorative art of Upper Aurignacian times in this centre seems to have persisted even in the areas occupied by the Proto-Solutreans, for at Prédmost, in Moravia, a conventionalised engraving of a woman in this style was found in layers containing Proto-Solutrean implements. Influences from this eastern focus seem to have penetrated to south Russia, where several examples are found, as at Kieff. These finds are always some miles south of the retreating glaciers, which at this time were some little distance to the north of Kieff.

The distribution of the Aurignacian is very wide, and as we have seen rich deposits occur in North Africa, while implements typical of this period have been found in Italy, to a certain extent over Spain, in South Germany, France, England, and Belgium. Spy, in the latter country, may be mentioned, as it

boasts rich deposits of Middle and Upper Aurignacian date, the latter containing a number of Font Robert points. Conditions of life were not yet favourable in Scandinavia, and indeed Man does not seem to have inhabited those areas till the end of Palæolithic times.

The Aurignacian is not widely spread over England; in the far north the climate was still too inclement, and it is mostly in the west that traces are found. The two best known sites are Kent's Hole, near Torquay, and Paviland in the Gower peninsula of South Wales. The latter has been excavated by Professor Sollas, and has yielded deposits rich in industries of Aurignacian and Pro-Solutrean date.

In the museum at Manchester there is a graver labelled as coming from the Piræus; this implement certainly dates from some time in the Upper Palæolithic age, and its occurrence in Greece is of considerable interest. Upper Palæolithic implements are also found in Palestine, some of which may be of Upper Aurignacian date.

Solutrean. The Solutrean people arrived suddenly in France, and form a sort of parenthesis in the middle of Upper Palæolithic

times. They are quite unconnected with the earlier Aurignacian civilisation, and supply no elements to the succeeding Magdalenian industries. If we use the same methods as we have previously used to determine the line of migration we shall find that the Solutrean arrived in France from the east, for rich deposits of very early Solutrean age are found in Hungary. Whether or no this was their birth-place, or only their halting-place, we are quite unable to tell. Very little is known of the physical characteristics of this people; in France skeletons of this age are of the Neoanthropic type, but perhaps they were only a warlike invading tribe dominating an Aurignacian population. Certain skulls in east Central Europe have been said to exhibit a mixed character suggesting an earlier Palæolithic people; and it has been proposed that the Solutreans were a distinct hybrid of these earlier people and Neoanthropic Man. As this race blending would be likely to occur on the outskirts of the Neoanthropic areas to the north-east, and the Solutreans appear to have migrated from somewhere near Hungary, this is not an impossible theory. Other distinguished anthropologists have considered that this

race arrived from much further east, being possibly an early migration from the same stock which later learnt the practice of agriculture, the domestication of animals, and invaded Europe. Dr. Haddon goes so far as to consider that they may be Proto-Nordics; their most distinguishing characteristic is the habit of pressure-flaking their implements. Their ordinary tools were the so-called "laurel-leaf" and "willow-leaf" javelin heads. Pressure-flaking enabled these to be made very thin for their size, and they must have been quite efficient weapons. The "laurel leaf" is not exclusively typical of Solutrean times; something resembling it has been found by M. Regasse in North Africa, in very late Acheulean deposits, being a final derivative of the chipped stone axe (coup-de-poing). Here, however, the implements were made by percussion, and rather recall the very rough primitive industries of Hungary, and the earliest ones of east France, which are classed as Proto-Solutrean. In Neolithic times "laurel-leaf" tools are quite common; we must therefore not take this tool as a definite indication of Solutrean culture.

After the Solutreans had reached France

and penetrated into the heart of the Aurignacian country, that is to say when they had crossed the line of the Rhône and Saône, south of the Loire, they developed a further stage beyond the typical Solutrean, which is obviously a direct derivative from the Proto-Solutrean. Besides the skilfully-made "laurel leaves" and "willow leaves" which abound, together with some simply made bone tools typical of Lower Solutrean levels, we find a shouldered point with pressure-flaking, probably derived from the Upper Aurignacian Font Robert point. These tools are also found in north Spain in the deposits of Altamira. The "laurel-leaves" of Lower Solutrean times persists, the Upper Solutrean shouldered point being simply an addition. This almost certainly shows the influence of the mass of the Aurignacian population, which had been penetrated by a relatively small number of Solutrean invaders.

The Solutreans did not spread all over France, and they do not seem to have reached the hill country to any great extent; they are not to be found in any numbers on the foothills of the Jura, or in the Pyrenees. In these areas Aurignacian Man went on developing independently and attained something not

unlike the succeeding Magdalenian cultures. Solutrean Man living in localities near these areas seems to have been partially influenced by this development; an example of this can be seen at a place called Lacave, not far from the Pyrenees. Here amongst other things we find eyed bone needles in Upper Solutrean layers; although poorly-made bone tools are never absent in Solutrean times, eyed needles are not known in Lower Solutrean levels, and it is only at Lacave, probably influenced by a culture developed in the Pyrenees, that such implements are known.

The general distribution of the Solutrean culture is of a certain interest; it seems never to have reached Spain (except north of the Cordillera Cantabrica, geographically south France), Italy or North Africa at all. The Upper Solutrean is confined to a line west of the Saône-Rhône boundary, and south of the Loire. A fairly early Solutrean culture seems to have reached the south-west regions of England, for in the middle of the Upper Palæolithic series of Kent's Hole, near Torquay, there occur a number of tools only to be described as rough "laurel-leaves." A few Solutrean implements have been found in south Germany.

Magdalenian. In Magdalenian times there is a great falling off in the stone industry and the flint implements do not show the same skill in workmanship which we have admired in those of Middle Aurignacian date. It would seem that flint had become rather less important as a tool-making material. The bone tools are of exceptional beauty, and show a technical skill which is simply amazing. In fact, the only flint implements which exhibit careful work are those used for engraving, and those used in the manufacture of bone tools, such as finely made delicate awls for piercing the eyes of small bone needles. Not only were the bone tools of many types and skilfully made, but animals were sculptured and engraved on them.

With the approach of the Bühl oscillation the climate grew colder in Solutrean times, and the Saïga, an animal preferring a cold "steppe" climate, appeared. There were times in the Magdalenian era when the climate was cold and dry, and others when "tundra" conditions prevailed and the atmosphere was cold and moist, but much depended on whether there were mountain masses near at hand. There is evidence to show that the cold increased to a maximum

in Magdalenian times, and then rapidly ameliorated; for the proportion of Stag to Reindeer diminishes, and then rises again, till at the end of Magdalenian times the Reindeer disappears for ever from France.

The Magdalenian culture seems to have been largely a direct development from the Aurignacian, and, as we have said, this development took place in the mountain districts of France to which the Solutrean never penetrated. The Magdalenian seems to be almost entirely a French culture, and it only occurs in Spain north of the Cordillera Cantabrica; it is not found in Italy or Africa, and its presence has not been proved in England. It is true that one or two Magdalenian objects have been cited, such as the double-barbed harpoon from the cave of Burrington Combe in Somerset, and the so-called "sceptre" from Cheddar in the same county. But the harpoon at any rate dates from the extreme end of Magdalenian times, and does not indicate more than an influence or migration of culture during the break-up of the Magdalenian civilisation in France. As far as is known, English Upper Palæolithic industries are more to be compared with those of Mentone, where the Magda-

lenian never penetrated, and which consist of an Aurignacian culture that continued to develop on its own particular lines. Cresswell Crags, in Derbyshire, may well indicate the same thing, as there is no evidence of definitely Magdalenian industries. This might also explain the absence in England of Cave Art, which, though starting in France in Aurignacian times, had such a great development in the Magdalenian. The occurrence of decorated bones is very rare in England, and most of those discovered are rather suspect. It must be remembered that England lies well to the north, and the climatic conditions were not nearly so suitable for flourishing human existence. But if Magdelenian Man did live in England it is surprising that he has left no records in the caves of the Mendips of the various periods into which these times can be divided. Gravels and deposits such as those of the Lea Valley north of London, which are of Bühl age, have yielded nothing that can at all help us.

Magdalenian industries are very common in the south-west of France, being especially concentrated in Dordogne and the Pyrenees. From a careful study of the bone lance points in conjunction with the harpoons, it has been

found possible to divide the Magdalenian era into six periods. The most primitive form of harpoon appears for the first time in the fourth sub-division, Magdalenian 4, the earlier Magdalenian 1, 2, 3 being determined by differences in the lance points. Placard, in the Charente, is the rock shelter most suitable for studying the earlier periods, while the typical late Magdalenian style is well seen at La Madeleine, near Les Eyzies. The Pyrenees have also yielded rich Magdalenian finds, which were excavated by M. Piette. A number of objects are decorated and the decorations differ in the various stages of the era, certain patterns or techniques being only found in one or two of these sub-divisions. Thus, for instance, bone silhouettes only occur in Magdalenian 2, 3, and this is important when we are considering the cave art, which will be mentioned later. For example, the art in the caves of Combarelles had, on various grounds, been assigned to Lower Magdalenian times; this has been confirmed by the discovery of some bone silhouettes in a little midden which is at the entrance of the cave.

The most primitive forms of harpoons, typical of Magdalenian 4, are found in the

same deposits as objects carved in slight relief and engraved; while the best Magdalenian engravings are found in Magdalenian 5, with single barbed harpoons, and the less artistic deeper engravings occur at the end of the era in Magdalenian 6, with double barbed harpoons. Naturally in these divisions there is much overlapping, as the individual skill of the artist has to be taken into account, as well as the persistence of more ancient fashions.

The Magdalenian era was the Golden Age of Palæolithic times in France. Of what was happening in the Upper Palæolithic eastern focus of Europe little is known, and the whole problem remains obscure.

CHAPTER VII

THE TRANSITIONAL PERIOD, AND THE CONNECTION WITH THE NEOLITHIC AGE.

For a long time very little was known of the cultures at the end of the Palæolithic era, and during the dawn of the succeeding Neolithic age. So much was this the case that prehistorians generally talked of a definite hiatus or gap between the two periods; the old Palæolithic book was finished and shut, and only then was the new Neolithic book opened. This idea seems to be confirmed by the fact that the old Quaternary fauna disappeared *en bloc,* some of the animals becoming extinct, and others migrating to distant and more suitable climates. This disappearance of fauna was due to a sudden alteration of temperature, and from this time onwards the climate became more like that of to-day and the fauna and flora were not unlike our own, except that, until the arrival of the Neolithic peoples, there are no remains of domestic animals, save in one place where

the bones of a dog were found. The remains of stone fruit and nuts occur in the deposits, the species being the same as those we have now. The change of conditions since the older days is absolute, the climate being not only warmer but also very damp. The increase in humidity is shown by the numbers of the moisture-loving snail (*Helix nemoralis*) found in layers of this age. It has been suggested that this climatic change may have been due to the final break through of the Straits of Gibraltar, and the consequent complete formation of the Mediterranean Sea. This change no doubt involved Earth movement, and probably the Straits of Dover were formed at the same time. Large areas of water would tend to equalise the long cold winters and short hot summers of the previous age, and would produce a more equable humid climate.

Men altered with the changed conditions, though still remaining Palæolithic in eastern Europe, that is without pottery, agriculture, or domestic animals. Owing to the disappearance of reindeer man had to make his tools of the much more rugged and therefore less suitable stag's antler, and he hunted the stag, roedeer, brown bear, wild pig, wild

cat, etc., in the vast forests that at this time covered the country.

M. Piette was the first to study the Transition period between the Palæolithic and Neolithic ages from an archæological point of view, and to describe the industries found in a layer lying between those of Magdalenian and Neolithic age in the cave of Mas d'Azil. It is from this cave that the culture was named Azilian. The implements, both stone and bone, in the Transitional layer show a great deterioration from those of Magdalenian date; the commonest tool was a little round flint scraper, flat underneath and with an edge chipped all round, and there were a few other poorly made tools. The bone tools are notably inferior; we no longer find the delicate eyed needles, the little lance-points, the forked base bone points, the sceptres, and the elegantly made harpoons that we associate with the Magdalenian times. The bone tools are now made of stag's antler, and consist mainly of rough polishers, etc., the only tool of note being the rough stag's antler harpoon which has already been described in the chapter on Tools. Decoration of weapons and other objects has totally disappeared, and hardly any trace of art remains.

The so-called "painted pebbles" are the only important novelty; these are ordinary round river pebbles painted with red spots, bars, curves or circles, or combinations of all four designs (*see* figure 16). The meaning of these pebbles has exercised the minds of prehistorians ever since their discovery, and no adequate explanation has yet been found. For a time M. Piette thought that they were some sort of message stones, or denoted a system of calculation. Mr. A. B. Cook, of Cambridge, compared them with some decorated Australian "bull-roarers." Lately, Dr. Obermaier has compared their decoration with that occurring on certain rock shelters in the south of Spain, where the art is largely composed of highly conventionalised forms of the human figure, so highly conventionalised that if we had not the whole series of degenerations we should not recognise the intended design, and he has suggested that the paintings on the pebbles also represent conventionalised human figures. But the south Spanish paintings are of late Neolithic and Eneolithic date, and the correlation between these two demonstrations of art is by no means convincing. At one place "painted pebbles" are found carefully broken in two.

Are we to see in this the work of a hostile people which has systematically destroyed something that was of vital importance to their enemies? At any rate, it is difficult to see in these "painted pebbles" anything in the way of either currency or objects of real magic. They could so easily have been made by anyone — just a round river pebble with a few smears of red ochre dabbed on without any artistic feeling at all. Can they have been toys, similar to the marbles boys used to play with?

As was pointed out at the end of the last chapter, there is evidence that the Azilian people broke into the Magdalenian world from the south, that is, from Spain. But this Azilian industry does not seem to have been very widely spread, and there was another contemporaneous culture by which the Azilian was encircled. This culture is called Tardenoisean, because industries of this date are commonly found in the Tardenoise in north-east France.

The Tardenoisean industries are practically all composed of minute pigmy implements, the characteristic tool being the pigmy graver. This was not due to the people being any smaller in size than the earlier folk, but to the fact that the tools

were not used singly, but a number of them were hafted into wooden frames and used as knives and saws. A great many of these little sharp flints carefully hafted to form the teeth of a saw would make a very business-like tool, and "tribula" (presses of wood studded with flints) were in use in Roman times; even to-day in Spain, Macedonia and Asia Minor, they occasionally take the place of a flail for thrashing the corn. A number of small flints carefully hafted in a piece of wood has been found by experiment to be a very good substitute for the steel brush used in the softening and preparation of leather. A number of sickles, made by hafting notched knife blades into a piece of wood curved into the proper form, have been found in Egypt; and what are probably representations of similar sickles have been found among the Neolithic or Eneolithic paintings of south Spain. Hafting was probably not unknown in Palæolithic times, and it is reasonable to suppose that "gravette" points or knife blades were so hafted; it is significant that at the end of Aurignacian times, as also at the end of Magdalenian times, a fair number of pigmy flints are found, though it would seem that only in Tardenoisean times did this method of hafting become dominant.

The pigmy flints are variously shaped, but the main characteristic is an edge or point opposite to which is a carefully blunted side. This blunted side was inserted in the wooden haft, and, being blunted, could not be pressed further into the haft, thus avoiding the danger of splitting it.

Whereas the Azilian industries are more or less confined to north Spain, the Pyrenees, Mentone, the Jura, and Belgium (with one or two anomalous and rather inexplicable occurrences in north-west England and west Scotland), and are distinguished by the typical flat stag's antler harpoons, the Tardenoisean industries occur all round the shores of the Mediterranean, and over Spain, France, and large parts of the British Isles. At the cave of Valle (Cantabria, north Spain) between Bilbao and Santander, the Tardenoisean culture is found closely associated with the Azilian; these two industries are thus found to be contemporaneous, the Azilian being probably only a Spanish modification which seems to have reached France at a slightly earlier date than the true Tardenoisean. It is thus convenient to call the whole of these Transition cultures the Azilio-Tardenoisean. Both these industries seem to

occur in the British Isles, the former being only represented by harpoons, no "painted pebbles" having as yet been discovered.[1] Harpoons of this date were found in the lower level of the Victoria Cave, Settle (Yorkshire), near Kirkcudbright, at Oban, and on the island of Oronsay.

The distribution of the Tardenoisean culture in England is still unknown, as these pigmy flints are often overlooked, being usually found on or near the surface. They have been recognised, however, in Cornwall and Lancashire, as well as at Hastings and in Cambridgeshire, etc.

The evolution of these industries has lately

[1] The so-called "painted pebbles" of Caithness are not of this date, being quite dissimilar, and probably of late Celtic age.

Diggings made at Burrington Combe by the Bristol University Spelæological Society have revealed implements showing a tendency to the Transitional type. There were also remains of skulls, one of which was pronounced "round-headed." In the writer's book, *Prehistory,* these finds were claimed as Transitional, but the later discovery of another piece of skull shows that all the skulls were "long-headed," and the date is therefore more likely to be some time just before the true Tardenoisean era. The industries are rather similiar to those in the upper beds at Mentone, where the true Magdalenian never penetrated, but where the Aurignacian continued to develop on its own lines. There was, however, Magdalenian influence, for a harpoon dating from the extreme end of Magdalenian times was discovered.

been clearly shown by M. Regasse, of Tébessa (Algeria), who has demonstrated that they are derived from the earlier Capsian culture, that is from the North African equivalent to Upper Palæolithic culture in Europe. A similar evolution can be seen in the industries of the Grotte des Enfants at Mentone, which are now preserved in the Archæological Museum at Monaco. Solutrean and Magdalenian cultures never reached as far south-east as Mentone, and in their stead we get enormously thick deposits containing slowly evolving Aurignacian industries. Magdalenian times are shown by the presence of Reindeer that arrived in Mentone during the Bühl period, but the Aurignacian evolution seems to have been undisturbed by any contact with the Magdalenian folk. The slow change of the Aurignacian "shoulder-points" into small triangular pigmy flints is clearly visible, and the top layers show a true Azilio-Tardenoisean culture.

Burials of this age are known in Spain, Portugal, Bavaria, etc. Occasionally, in Spain the burial is under a definite tumulus.

In south Scandinavia we find a culture probably contemporaneous with the Azilio-Tardenoisean of the south of Europe; its

origin is obscure, although it may have been a migration from the eastern focus of Palæolithic culture towards the south of Poland, where, it has been suggested, special cultures had developed, which were driven to seek a home in distant uninhabited lands by pressure from the east. This eastern pressure may have been due to climatic changes, which by making lands in Central Asia more and more inimical to flourishing human life, forced the inhabitants there to migrate. At the same time the Scandinavian ice sheet was rapidly retreating, and the shores of the Baltic had been left open to the first comers who chose to settle there. This earliest Scandinavian culture is called the "Maglemose," and examples of the industries have been found as far south as Boulogne, and as far west as east England (two typical harpoons having been dug up in the peats near Holderness).

A good deal of land movement occurred at the end of Palæolithic times in Scandinavia, which we need not treat of in detail. The Baltic was first open to the west, and to the ocean, then became a lake (Ancylus), after which a side opening to the west appeared, and, finally, the conditions of to-day were attained. In Ancylus lake times the birch

and pine flourished, but were replaced later by the oak; and the Maglemose culture dates from the pine period to the very beginning of the oaks; it was followed by the earliest true Neolithic culture of the "kitchen middens," etc. Maglemose industries are at present but poorly represented, but the typical tool was a long harpoon made of bone. A naturalistic decorative art has been discovered, faintly recalling that of the Magdalenian age, but infinitely poorer in technique. A conventionalised art also occurs which is peculiarly interesting for purposes of comparison. This consists of the human form conventionalised until it almost becomes a honeycomb pattern. It is quite possible that we here see the influence of Neolithic peoples acting on the peculiar Palæolithic civilisation of the eastern focus. The whole of this branch of the subject is, however, still very obscure; further finds are required, as well as more detailed study, before anything definite can be stated. It is outside the province of this small book to enlarge on what may prove to be a very illuminating and interesting branch of prehistoric study.

Continual mention has been made of Neolithic influence from the east. In order to explain what is meant by this, and more par-

ticularly to enable the reader to link on the study of Palæolithic Man with the Neolithic and Bronze Ages and the succeeding historical times, a word or two to show what this culture was, which so profoundly and permanently altered human life and existence, may not be out of place. The change in climate has already been noted, and also the fact that the people far to the east had become restive and were penetrating the now favourable lands of Western Europe. We have at present no knowledge of the cradle of these new folk, or how their civilisation had grown up. Wonderful towns, such as Susa, in Persia, and Anau, in Turkestan, have been excavated, and have yielded fine examples of painted pottery, etc. Some of these remains probably date in time as far back as the late Palæolithic times of Western Europe, and it would seem as if the new cultures which spread tentatively at first, and, later, altogether overwhelmed the hunter civilisation of Western Europe, came from somewhere in these areas. The main differences introduced were agriculture, domestic animals, and pottery, but how these were developed in their eastern home is at present merely a matter of conjecture.

Their influence in Western Europe was

profound. So great was the change in conditions that the old Palæolithic hunter had either to absorb the new culture, migrate to distant lands, or become extinct. In the Mediterranean Basin the Tardenoisean culture persisted for a long time; later with the addition of a trapeze-shaped pigmy flint, pottery, and remains of domestic animals, etc.

In order to understand this a general glance at Palæolithic life and at the introduction of these new developments is necessary. France, the most favoured country of Western Europe, in Upper Palæolithic times must have been but sparsely inhabited. No country can support a very large hunting population, and in spite of the wonderful manifestations of art, whether on decorative objects in the "homes," or on the cave walls, life must have been extremely primitive and rude. It is difficult to imagine any very elaborate tribal organisation, though a certain gregariousness is seen in the concentration of the Upper Palæolithic homes round Les Eyzies. No doubt the country was admirably suited for this, having so large a number of natural rock shelters; certainly, there was what we may describe as a prehistoric metropolis at Les Eyzies. A certain

amount of intercourse over wide areas must have been possible; we see this when we study the artist caste, and the presence of sea shells in ceremonial burials at Les Eyzies, a place so far removed from the sea, seems to indicate either lengthy expeditions or a form of primitive barter. All the same, in many ways life must have been very individualistic, and there cannot have been much in the way of specialisation, or individual property — except, perhaps, a few tools, ornaments and the like. Raw flint (at any rate, in the Dordogne) was very common, and tools were easily made, and cannot have represented anything of very great value, and the same applies to bone tools. The only other personal possessions would have been clothes, no doubt made from the skins of animals, and since furry animals were very common at the time, one would imagine that these garments might represent personal prowess, but would scarcely be extraordinarily valuable personal property. In our own day ermine is valuable because of its rarity, and the difficulty of getting skins; a coat of rabbit skin equally good for keeping out the cold has little value beyond the work of making it up, and this in Palæolithic days the hunter may have done himself.

With the advent of agriculture, domestic animals, and pottery, a totally different state of affairs is produced. In the first place, well-made pots, planted fields, and flocks, and herds, bring in at once the problem of personal, or, at least, of communal property. This must be protected against Man's enemies, and the enemies are by no means only wild animals. Not only would it be much easier to raid the domestic herds of a neighbouring community, rather than hunt wild animals, but when the crops were ripe the result of much heavy work during the previous year would be secured by a successful raid; a supply of food for the year would reward the robber, and the owners would starve. Thus specialism would have to be introduced, a part of the community would undertake the duties of defence, and as they were defending their neighbour's property as well as their own, a much closer communal feeling would necessarily spring up. But specialisation does not stop here — a knowledge of domestic animals, or of agriculture and the manufacture of special tools all require much more specialised work than was needed in the simple hunting life of the old Palæolithic folk; we, therefore, may as-

sume that something in the way of a real village life was developed. Specialism begets invention, for the person engaged in some special job will occasionally have an inspiration and discover how to make his special tool more effective, or an easier method of manufacture. Although the human mind inclines to be conservative rather than plastic, these new inventions will often be adopted, with the result that local differences are likely to grow up, and only disappear or become general when intercourse over wide areas is definitely established. The same is to a certain extent true of pottery, and it is rather a matter of surprise that Early Neolithic pottery, with its rude decorations, should have been so little varied as it is in Europe.

But the greatest change produced by agriculture and the domestication of animals is the increase of population due to the much larger and more assured food supply. This acts in several ways on Man's progress, for not only does it force him more and more into definitely tribal habits, but the more people there are, the more likely is the birth of the occasional genius who really eases the processes of human life by the discovery of

some method of adapting natural forces to the service of Man.

The Neolithic culture is profoundly different from all that preceded it, though we have shown that no actual hiatus existed, and that Western Europe was inhabited continuously. In the Mediterranean Basin no sharp line of demarcation can be drawn between the Tardenoisean and the earliest Neolithic civilisations. The writer personally believes that the Tardenoisean culture as a whole became absorbed in the Neolithic culture that was drifting in, and thereby became Neolithic, contributing largely to form the culture which is usually classed as belonging to the Mediterranean race; that is to say, that the Mediterranean race of south Europe is, to a large extent at any rate, only a modification of Palæolithic-Neoanthropic Man changed by the absorption of the new Neolithic culture. The "round heads," who appear in Tardenoisean times, and who were probably the first people to introduce the New Neolithic culture into Europe and the Mediterranean Basin, were probably precursors of the so-called Alpine race that settled in the high lands of Europe. North Europe came largely under the influence of

the so-called Nordic people, who arrived there at a yet undetermined date. It is various hybrids of these Alpines, Nordics, and Mediterranean folk, which enter into the composition of most of the basal stocks from which modern European nations are derived.

A suggestion that the Solutrean episode was of the nature of a proto-Nordic invasion of Western Europe has already been noted; but much more investigation is required before this intensely interesting problem of the movements of peoples at the beginning of Neolithic times can be properly elucidated.

These Neolithic peoples were not long in adopting the use of Bronze, and there arose, especially in the Mediterranean area, a wonderful civilisation with a wide influence. But the study of these times requires another volume to do it justice. This civilisation was broken up by new folk, also from the east, who had discovered the use and manufacture of iron tools. These are the so-called Aryan-speaking peoples. Where their birthplace was or what admixture of basal stocks went to their formation, is uncertain; at all events, the European peoples contain a strong admixture of them.

By what route did these peoples penetrate into Europe? It is out of place to discuss this question here, but the shores of the Mediterranean, and above all the line of the Danube, were ever open gates into the rich lands that stretched towards the setting sun.

CHAPTER VIII

PREHISTORIC HUMAN REMAINS

It is hardly the function of so small a volume to go very deeply into this side of the question. Moreover, the detailed comparative study of prehistoric skeletons involves considerable anatomical knowledge in the reader. Even apart from this difficulty comparative physical anthropology is best studied in museums, where the skeletons of modern primitive people and those of prehistoric Man can be compared. There are, however, a few books dealing specially with this branch of the subject. A few general notes are not out of place, especially as it will be found that in more than one instance we are concerned with ceremonial burial.

It is but rarely that prehistoric skeletons have been found, and then, in nine cases out of ten, owing to the ignorance of the finder or other causes, most of the important data connected with the find are permanently lost.

For example, many remains of Man found by workmen digging gravels have no doubt not been recognised, and have been simply thrown on one side, or, if they have been taken to a local archæologist, he, not understanding their importance, has omitted to collect exact data as to where they were found, at what level, and under what conditions. Much too late (often years afterwards) a specialist has come on the scene, but by that time it is often impossible to collect reliable evidence, and even if on examination these finds themselves prove to be important, it is obviously dangerous to found any theories on them unless the geological evidence as to date and conditions is certain. Another way in which precious information is lost is exemplified by the case of the cave of Aurignac, in the south of France. This small cave was used by prehistoric Man as a burial place, and when discovered in the course of quarrying (a good many years ago) contained a large number of skeletons. The local Curé took possession of these before they had been examined, and had them buried in the village churchyard. It is only fair to hope that such a thing would hardly be done to-day.

We know nothing of the human remains of Tertiary Man in Western Europe. In Java, a being somewhere between Man and the anthropoids, called *Pithecanthropus erectus,* has been known for some time. Whether or no it was creatures of this nature who chipped the flints of Foxhall remains to be demonstrated.

Accurately dated Lower Palæolithic human remains are also unfortunately lacking, but there are two finds which are of capital interest dating probably from this period—one from Piltdown in Sussex (England), and the other from the Mauer sands near Heidelberg (Germany). Piltdown is not far from Uckfield, and the Piltdown gravels, in which these remains were found, occur about eighty feet above the level of the river Ouse on a large, well-defined plateau. The exact age of these gravels cannot be determined, but Mr. Dawson, of Lewes (the discoverer of these remains) was probably right in suggesting that they are to be referred to some warm period at the beginning of the Pleistocene age. If this is the case this skull would be of Pre-palæolithic date rather than Chellean. Only portions of the skull were found where the first diggings were made, together with

the lower jaw and a canine tooth, but a few fragments of a second skull of the same kind were discovered some little distance away. The bones are very little rolled, much less so than the fragments of Mastodon and other Tertiary fossils which were also found in the gravels. A few very rough implements, and some flints showing the action of fire, were in association with the skull, but these are of no use for an accurate determination of its date. The fact that only the skull is preserved to us is interesting, for the heads of the femur and other limb bones are equally resistant. It has been suggested that gently flowing water has a selective action and that the limb bones may still be preserved somewhere, but at an unknown distance from the skull. It is just possible, though hardly probable, that for some strange reason the creature had been decapitated. There are three main points of interest in this find; in the first place, the forehead is high like our own, and not low and receding; this is of special interest, as it has always been affirmed by the biologist that Man's Precursor must have had a high forehead. In the second place, though the teeth are human, the lower jaw is chinless

and closely resembles that of a chimpanzee; so much so is this the case that some palæontologists have affirmed that the jaw is that of a chimpanzee, and that its association with the rest of the skull must be fortuitous. It is difficult to maintain this view, for not only does an examination of the teeth indicate various human characteristics, but it is almost incredible that in a cubic yard of ground there should chance to occur the skull of a human being without a jaw, and the jaw of a chimpanzee without a skull. Again, the remains of chimpanzee, dating from this time, are not otherwise known in England. Lastly, the thickness of the Piltdown skull is exceptional and the occurrence of the fragments of the second skull already mentioned indicates that we are not dealing with an isolated sport.

The other find, which from a geological point of view is also probably Pre-palæolithic rather than Chellean, is that of a lower jaw from the Mauer sands near Heidelberg. These Mauer sands occur below the older loess, and the fauna, amongst others, includes *Elephas antiquus, Rhinoceros etruscus, Cervus latifrons,* and *C. elaphus, Equus stenonis,* and *E. caballus* and Bison. The

jaw itself shows no trace of a chin, and rather recalls a gibbon, but the teeth are human. In many ways it suggests a primitive and massive Neanderthal jaw of Mousterian age, a jaw which will be described shortly. In this connection the reader will do well to remember what has been said about the evolution of Neanderthal Man, and his early occupation of south Germany.

Mousterian or Neanderthal Man. Diggings in Mousterian deposits have brought to light many human remains which can be definitely cited as being of this age. The first discovery of human remains of this type was made as long ago as 1856 at Neanderthal, in a small cave opening on the side of the valley. Although not actually in association with the bones of Quaternary animals, remains of Mammoths have been found in another cave hard by under exactly similar conditions. Other important finds of this date hail from Spy, near Namur (Belgium), from La Ferrassie, near Les Eyzies, Dordogne (France), and from La Quina in the Charente (France). In 1908, at Chapelle-aux-Saints in the Corrèze (France), a fossilized human skeleton was discovered by two Frenchmen, MM. Bouyssonie and Bardon, which was associ-

ated with implements that could be definitely dated as Mousterian. The skeleton, which had been carefully buried, was almost complete, and has since been ably described by M. Boule, of Paris. The forehead is low and receding, with thick brow ridges; the brain case is large, being some 1,600 cubic centimetres. An internal cast indicates a brain of low intelligence; the jaw is chinless and rather prognathous. The height of the individual was probably about five feet four inches, and the thigh bones are massive and rather curved. Human teeth definitely dated of this age have been discovered by Dr. Marett, at S. Brelade's Bay, Jersey. An interesting point is the fusion of the roots of these teeth; another place where teeth with the same peculiarity have been noted is the rock shelter of Krapina (Croatia).

Reconstructions of Mousterian Man have often been attempted, and the reader may remember the ape-like creature which was figured some years ago in the *Illustrated London News*. The remains of Man previous to the arrival of the Upper Palæolithic folk are often described under the general term of Palæoanthropic

Upper Palæolithic Man. The Upper Pal-

æolithic age heralds the advent of a totally different race. As has been already said, these people probably arrived in Western Europe from North Africa; they are generally classed as Neoanthropic people, in contradistinction to the Palæoanthropic Man already described. The use of the term Neoanthropic is not universal, and the reader who is intending to study this branch of the subject further, will find that the French term Cro-Magnon race is often substituted for the western European variety of Aurignacian times. Skeletons of this age have been discovered at Cro-Magnon (Les Eyzies), but as many modifications of this race are known, of which Cro-Magnon is only one, it seems misleading to call a race by the name of one of its modifications. As in the case with all Palæolithic remains, the skull is long-headed, a broad face being often associated with it, making the whole disharmonic. The brain capacity was large, so large indeed that Neoanthropic woman's brain capacity was larger than that of an average man to-day; we know nothing, however, of its quality except that people who practised the wonderful art which we shall be shortly studying, and the elaborate magic that we shall at-

tempt to outline must have been already far advanced in the scale of human intelligence. The forehead is upright, and the limb bones are thick, the shin bones being flattened transversely. The eye sockets are remarkably broad and low, their angles being but slightly rounded. The lower jaw is massive with powerful jaw muscles, and there is a prominent triangular chin. Several varieties of Aurignacian man occur; such as the Combe-capelle skeleton, and that of Cro-Magnon itself. Possibly one might include the skull found at Chancelade, near Périgueux (France), which, from the associated industries, is definitely of Magdalenian age. What exactly these modifications indicate cannot at present be definitely determined. It may well be that the Upper Palæolithic folk, by the time they reach France, and during their residence there, were no longer of pure stock, but were already intermixed with other races; or it may mean that, under the conditions of life existing in France at that time, definite modifications of the skeleton took place.

It is interesting to note that the first discovery of a skeleton of this age was made in south Wales on the promontory of Gower, in the cave of Paviland, by Buckland, about

1823. The skeleton, found buried in red ochre, is that of a Man. It is preserved in the Museum at Oxford, and was till lately erroneously called "The Red Lady of Paviland."

Evidence of another race living at the same time in the south of France has been brought forward by M. Verneau, who claims that two skeletons found with others at the Grotte des Enfants, near Mentone, show different characteristics of a distinctly negroid type. His conclusions have been questioned by some, but the idea of a second race (the so-called "Grimaldi race") has become widely spread. The affinities and connections of these new people cannot be determined, nor their relationship to other Neoanthropic men. Further study, and more particularly further discovery of remains of this type, are required. The problem of whether the skeletons of Solutrean ages are to be referred to the true Cro-Magnons or not has been discussed in the chapter dealing with the Upper Palæolithic period.

Transitional period. Proofs have already been given from a study of the industries that the Azilio-Tardenoisean people of the Mediterranean Basin must have developed largely from Aurignacian Man. In studying

burials of this age the character of the skulls is found to be mixed, there being both long-headed and broad-headed varieties, indicating a mixture of races. This is true of the finds at Ofnet in Bavaria, and also at Mughem in Portugal. In both places the long heads largely predominate over the broad. Is it not a reasonable suggestion that the long heads are derived from the old Aurignacian folk, while the round heads are precursors of the Neolithic civilisation that was so profoundly to alter the life and customs of Western Europe? If this is so, may we not assume that the so-called Mediterranean race is in great part only the old Aurignacian folk after it has absorbed the new Neolithic civilisation brought thither by these round-headed people?

Ceremonial burial. Nothing in the way of ceremonial burial has been noted before Mousterian times, but thence onwards it is to be found amongst Palæoanthropic and Neoanthropic people. The skeleton of La Chapelle-aux-Saints was carefully buried in a trench with a number of well-made stone implements. But the most curious ceremonial burial of this age has lately been discovered at La Ferrassie. La Ferrassie is a

rock shelter some miles from Les Eyzies, and the industries it contains date from Acheulean to Upper Aurignacian times. At one place there are two Mousterian deposits of slightly different colour, the lower one being brownish, the upper one black. Resting on the surface of the brownish layer, but completely covered by the black layer, was found a large rock which had probably been placed in position by Man. The black layer contains bones of animals, stone implements, etc., and so there is no problem as to date. M. Peyrony, of Les Eyzies, who has dug so much in Dordogne, had the happy idea of excavating under the rock in the brownish Mousterian layer. There was then discovered a filled in trench containing a human skeleton; but the surprising thing was that the limb bones were carefully placed on one side of the trench, the head on the other, and the bones of the face had been entirely removed. Further, and still more surprising, when the rock that covered the skeleton was examined, it was found in be covered with carefully made artificial cup-markings. This is one of the most extraordinary ceremonial burials known, and it is the earliest example of cup-markings that has yet been found.

There is no question as to date, for the trench is excavated in the brownish layer which, as has been said, is of Mousterian age. The black Mousterian layer covers all.

Ceremonial burial has often been observed in Upper Palæolithic times, a skeleton being frequently buried in red ochre. Such for example is the case with the Solutrean skeleton at Klause in Bavaria. Sometimes necklaces and finely-made tools are placed near the body; at Cro-Magnon there are necklaces composed of sea shells, although Les Eyzies is many many miles from the sea; these, therefore, must have been obtained with a certain difficulty.

One of the most remarkable burials is that of Mentone, where one of the males had his arms crossed, though not his legs, and had a sort of head dress of perforated shells, his head resting on a block of red stone. The female was found completely enveloped in a covering of non-perforated shells. It may be remarked that the flexed position is common where the knees are often drawn up to the head, the body resting on its side. The burial at Ofnet (Bavaria), of Transitional age, is of particular interest; the remains consist solely of skulls, and there is clear evi-

dence that the people have been decapitated. The skulls are arranged in concentric circles facing westwards, and consist of old women, young women, and young men. The old women have many necklaces, the young women few, and the young men none at all.

What are we to think of this ceremonial burial that was practised even in Palæoanthropic times? Was it a definite cult of the dead due, perhaps, to fear — or maybe for reverence? Are we to see in it the dawn of emotions that can only be described as religious, which in Upper Palæolithic times existed side by side with other emotions arising from a desire for food, and which, as we shall see, gave birth to the practice of sympathetic magic?

CHAPTER IX

PALÆOLITHIC ART

A BRANCH of the Neoanthropic race in Upper Palæolithic times introduced into Western Europe the practice of a living and wonderful art.

For purposes of study it is best to divide this art into two sections. The first section is the so-called "Home" art (French "Art Mobilier"), consisting of objects actually dug up from the "homes" of Upper Palæolithic Man. Under this head come all the delightful sculptures and engravings from the French caves, of which the originals, or casts, can be seen in many of our museums. The second section is the "Cave" art, comprising the wall paintings and engravings in the caves. This section can itself be divided into two groups. The first group consists of the so-called "northern" group of decorated caves in France and north Spain. The second group is confined to east Spain, where

the Art is on the walls of shallow caves and rock shelters.

Decorated objects from the deposits, or the "Home" Art. When the explorer comes to excavate under over-hanging cliffs he sometimes finds decorated fragments of bone and stone. Occasionally there are bone weapons engraved or sculptured with the figures of animals or with conventional patterns. Paintings are naturally very rare in the "Home" arts, for earthy deposits are not a very suitable medium for their preservation. Among examples of paintings found in deposits are the painted human hands of Sergeac, near Le Moustier (Dordogne), and an inferior painting of a bison in the early Magdalenian layer at Laugerie Basse. Neither of these can be strictly classed as "Home" Art, as there is some reason to believe that the limestone blocks on which they are painted may have fallen from the cave walls and been buried by the slow accumulation of deposits.

Obviously in the "Home" Art the question of the authenticity of the artistic objects presents few problems. The decorated utensils are often found in stratified layers with typical stone implements and the bones of

extinct animals, so that it is possible to construct a definite sequence of cultures. The question of authenticity and even of date, therefore presents little difficulty.

Art first appears with the coming of the Upper Palæolithic people. We find examples in Aurignacian layers, but the Solutrean people seem to have practised no form of Art, and the one or two isolated examples of decoration found in deposits of this age may be due to the influence of the older surrounding Aurignacian people. The Magdalenians, on the other hand (who, as we have seen, were largely a derivative from the older Aurignacian stock), revived the Art, exhibiting far greater skill and a much more elaborate technique. In fact the skill shown by these Magdalenian folk might well be the envy of many an artist to-day.

It will be convenient to consider this "Home" Art under two heads: (1) Decorated objects of the Aurignacian age, and (2) those of Magdalenian age.

Aurignacian "Home" Art. The art of the Aurignacian age is rougher than that of later date. It is widely distributed, being found from Cantabria to Austria. There are examples of sculpture, bas-relief, and line

engraving.[1] The Aurignacian sculpture consists of representations of the human form. The "Venus of Brassempouy" (in the south-west of France), and that of Willendorf (in the Danube valley), may be given as examples. The first of these dates from Lower Aurignacian times, while the second is of Upper Aurignacian age. Other examples have been found, as, for instance, the statuettes of Mentone.

The "Venus of Brassempouy" (*see* figure 5) is a particularly fine specimen sculptured out of Mammoth ivory, and probably was originally painted; it is quite a tiny object, being little over an inch in length. The "Venus of Willendorf" is larger, the whole body being represented. It is carved out of a fine oolite limestone. In the first statuette the face and hair are carefully indicated, in the second they are more summarily treated, the face itself not being indicated.

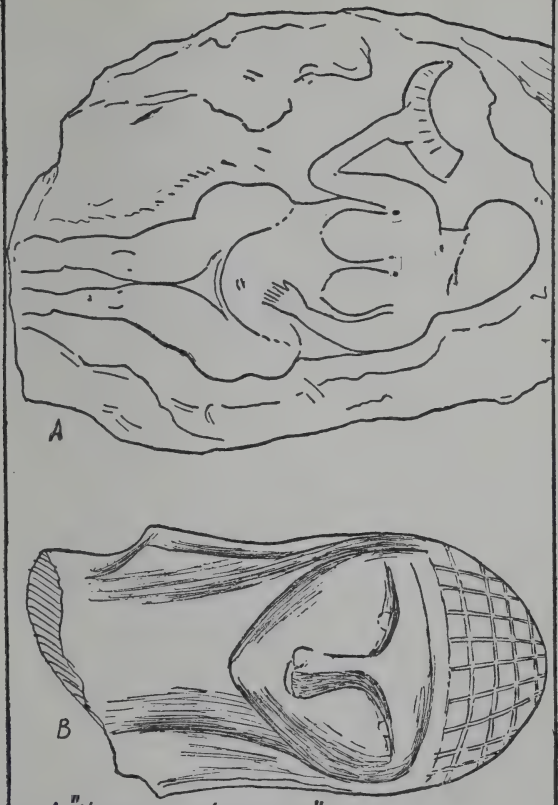
Bas-reliefs. In the layers at Laussel (layers definitely dated as Upper Aurignacian by

[1] It may be well to point out to the reader that the theory of the French prehistorian Piette, that sculpture necessarily preceded line engraving in the evolution of art, is not, strictly speaking, accurate, although it is true that the proportion of sculpture to line engraving is much larger in the earlier times than at a later period.

the presence of "gravette" points, etc.), bas-reliefs, sculptured on blocks of limestone, are found. These also represent the human form, the most famous being the so-called "Venus of Laussel" (*see* figure 5), which is sculptured on a block of limestone about two feet in height and represents a woman full face holding a bison's horn. There is evidence that this was originally painted with red ochre. Unfortunately the details of the face have worn away in the course of ages. Many other figures have been found at Laussel, amongst them a "hunter" in profile, of which the head is unfortunately lacking. Laussel is not the only locality where bas-reliefs of Aurignacian age have been found, though up to the present it is the most important.

Engravings. An engraving of early Aurignacian times on a broken fragment of bone was found in the diggings at Hornos de la Peña (Cantabria); it represents the hind-quarters of a horse, the rest of the animal being lost. This is purely an outline engraving; only two legs are shown, though the line is deeply cut and vigorous. To the east of France, at the Grotte de Trilobite, an engraving of Rhinoceros on a piece of schist was discovered in deposits of Upper Aurig-

FIG: 5



A: "VENUS OF LAUSSEL"
B: "VENUS OF BRASSEMPUOY"
(ABOUT 3 TIMES NATURAL SIZE)

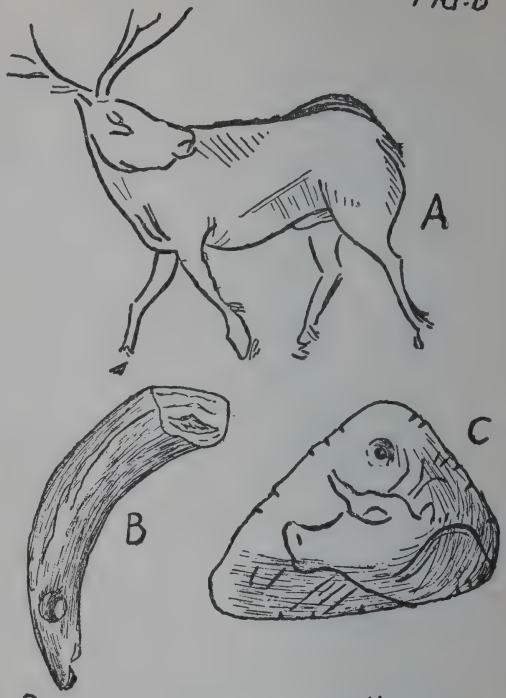
nacian Age; to the south of this place, at Colombière, near Poncin (Aisne), pebbles have been collected engraved with figures of Reindeer, Musk Ox, Rhinoceros, Cave Bear, Wild Cattle, Feline, Stag, Chamois, and Man. Although the industries associated with these pebbles have been classed as Upper Aurignacian, it may well be that they belong to a very advanced Aurignacian culture, which continued to evolve towards the Magdalenian in areas to which the Solutreans never penetrated. Colombière is in one of these areas, and a careful study of these engraved pebbles rather strengthens this conclusion. In Central and Eastern Europe, in contact with what has been described as an Eastern Upper Palæolithic focus, we find an interesting and very peculiar art. An example of this is the very conventionalised human figure from Predmost, which, though it is found in association with early Solutrean implements, is probably connected with the Upper Aurignacian culture of this Eastern focus. Again, at Mézine, in south Russia, a number of curious objects were found, some sculptured, some engraved, the designs including the Greek key pattern; while at Kieff an undecipherable engraving on mammoth tusk

was found, probably dating from this period. Geometrical patterns do not appear in Aurignacian times.

Magdalenian "Home" Art. The Magdalenian "Home" Art includes sculptures, bas-reliefs, and engravings, usually of animals or conventional patterns; occasionally what seem to be representations of plants occur. As in the case of the Aurignacian art, sculpture is commonest in Lower Magdalenian times, the proportion of engraving rising in the later Magdalenian age. A particular derivative of sculpture occurs when bones too thin for actual sculpture are used; these are best described as "bone silhouettes," the flat bone being cut out in the shape of an animal. Les Eyzies and one or two caves in the Pyrenees can boast of being the richest in Magdalenian treasures, though specimens are found from Cantabria to the Jura.

The six stages into which the Magdalenian period can be divided have already been sketched out, and to a certain extent the evolution of the Magdalenian "Home" Art can be correlated with this sixfold division. This correlation carries us into minute details of a still incomplete study, and for further notes on the subject the writer's "Prehistory" may be consulted. It will be enough to

FIG:6



A: REINDEER TURNING ITS HEAD
(FROM LAUGERIE BASSE)

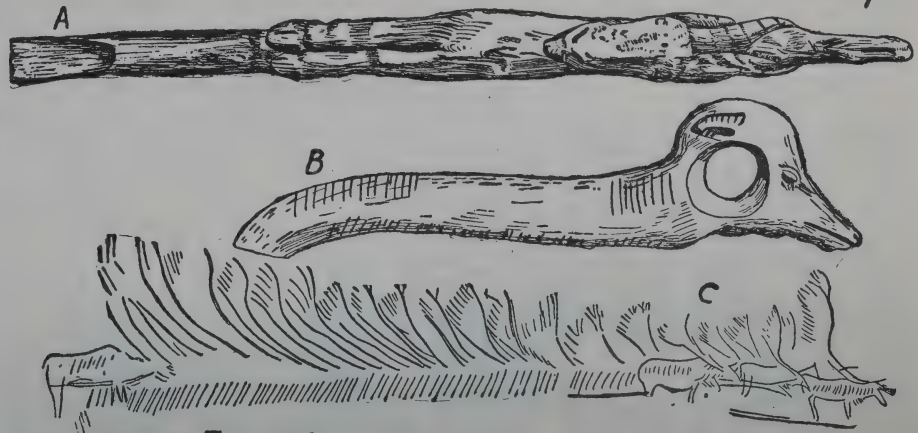
B: HORSE TOOTH PIERCED FOR THREADING

C: ENGRAVED AMULET
(FROM LIVYRE)
(ORIGINALS IN AUTHOR'S COLLECTION)

remark here that most of the fine engravings seen in our museums or reproduced in books seem to be of Magdalenian 5 age (*see* figure 6).

Conventional patterns are of great importance as an aid to classification, as this form of art usually results in rather specialised and easily recognisable designs. Some of them seem to have had a wide vogue, but their fashion lasted only a brief time. Thus, the concentric circles and spirals of Arudy (thought by Breuil to be derived from the eye of a bison), are never found except in Magdalenian 3 and 4 times; or again, little round plaques with a hole in the centre from which radiate engraved rays seem to be a characteristic fashion of Magdalenian 4. Being easily recognisable and seeming only to occur for a short time, this sort of decoration is often very useful for dating layers. Examples of similar geometric patterns are frequently found from such widely separated areas as Cantabria and the Jura. Conventionalisation (usually of animals) also appears in Magdalenian times, tentatively at first, but in an increasing degree as we approach the end of the period. This conventionalisation is of special interest, and deserves a separate study. Prehistoric Man,

FIG: 7



A. "IBEX" SPEAR THROWER
(FROM MAS D'AZIL)

B. "FOX HEAD" SCEPTRE
(FROM PLACARD, CHARENTE, NR. OF BORDEAUX)

C. REINDEER HERD
(FROM TEYJAT)

either through laziness or for other causes, gradually gave up making a naturalistic drawing of the animal he wished to represent, and substituted an indication of its most individual characteristics. Thus, for example, take the reproduction of a horse head viewed full face. Man noted a long head, two ears and the angle between them bisected by the mane. He therefore presented a horse's head (full face) by a vertical line from which sprang on either side near the top two oblique lines pointing upwards, the whole forming a sort of trident, of which the two side prongs represent the ears and the central prong the mane. In the case of a bull's head viewed full face, there being no mane, the centre prong is omitted, while the two outer prongs are doubled, representing two ears and two horns respectively. The final result of conventionalisation is often unintelligible, unless one has the whole series starting with the naturalistic portrait of the object. It is interesting to find that Prehistoric Man himself seems sometimes to have copied these conventional signs without understanding them, for we have at least one instance when a later Magdalenian artist drawing one of these signs (meaning a fish) has re-natural-

ised it wrongly, placing the head where we know from a study of the series the tail should have been. A very interesting variety of conventionalised drawing was found at Teyjat (Dordogne); a herd of reindeer is represented, and while the artist has fully drawn one or two reindeer at each end, the rest of the herd are only indicated in a conventionalised manner by a few strokes, yet the effect of a herd of reindeer is well produced (*see* figure 7).

Much more study must be given to the "Home" Art before we shall have learnt all that it has to teach us. It is important in a consideration of the main movements of peoples, etc., but it is still more essential for studying the history of all the people living in various localised areas. Its evolution also is extremely interesting, and none the less so, for the fact that the succession is broken in the barren Solutrean period.

As has been seen, a close relationship between the Aurignacians and the Magdalenians seems certain, though how far other influences helped in the development of the culture of the latter is still a doubtful point. But we have only to examine the little ivory statuette from Brassempouy, on the one

hand, and on the other hand the wonderful engraving on bone of a stag turning its head, with a fish, etc., found in the cave of Lorthet (which English readers will find described by Sir Ray Lankester in the *Field* of May 1911) to realise that we are dealing with a very marvellous artistic manifestation which in the case of Aurignacian art is not the art of an infant, though from its date it may well be the infancy of art.

Cave Art. Cave Art is divided into two groups, and we will deal first with the so-called "Northern" group. This art, which is naturalistic, is found decorating the walls of natural caves, often at long distances from the entrance. Natural caves were utilised, and therefore we need only expect the art where natural caves occur. Caves of any considerable size are only found in limestone, being due to solution of the rock by underground streams, which have worked their way to lower levels leaving their original channels dry. No ethnic significance should be attached to the distribution of this cave art in Europe, since naturally we can only hope to find examples where limestone occurs.

For convenience sake five areas may be marked out. Two of these are in France,

two in Spain, and one in south Italy. In France we find firstly an area in the department of the Dordogne, mainly around Les Eyzies, which includes such well-known localities as Font de Gaume, Combarelles, La Mouthe, and Cap Blanc (*see* map). There are two outlying places of some importance — Teyjat, also in the Dordogne, and Pair non Pair, in the Gironde, close to the junction of the Dordogne with the Garonne.

The second French area is in the Pyrenees. The art, as far as is known at present, is concentrated in Ariège and the departments which border it to the west. Niaux, Portel, Tuc d'Audoubert, Trois Frères, Marsoulas and Gargas are in this country.

The first area in Spain where decorated caves of this "Northern" group occur, is in Cantabria, north of the Cordillera Cantabrica, the mountains which continue the line of the Pyrenees into north Spain. From a geographical and climatic point of view this area may rather be considered as attached to the south of France than to the rest of Spain. There are many and wonderfully decorated caves here, such as Altamira, Castillo, Pasiega, Hornos de la Peña, and Pindal.

The second area is in south Spain, more or

less in the limestone massif stretching from Malaga to just beyond Ronda. How the "Northern" group of art came to be represented in this area is not known; the only intermediate examples are in the north in the province of Burgos, and might easily be explained as a trickle of the northern culture southwards over the mountain. Only two or three localities of this series are known, the most prominent being La Pileta.

The area in South Italy, up to the present, comprises but one decorated cave containing some poor engravings of horses. Their connection with the main "Northern" group is obscure, and a good deal more exploration is needed in this region, where further finds of decorated caves are probable.

The history of the discovery of the Cave Art, its sceptical reception by the scientific world, and finally the conclusive evidence of its authenticity, forms a romantic chapter in the study of Prehistoric Man. It is now nearly fifty years ago that a Spanish gentleman, the Marquis de Sautoula, and his daughter aged five, wended their way up the grassy slopes that lie between the ancient village of Santillana del Mar and the newly-discovered cave of Altamira. Mere chance

had led to the discovery — a fox had run to earth, and while digging it out the entrance to the cave had been disclosed. The Marquis was going to excavate, for Prehistoric Man had lived in the vestibule of the cave, and the tools and rubbish dropped by him had been found in the deposits. The main chamber at Altamira, to the left of the entrance, is only some five feet or so high, and the Marquis entered it stooping. After a time the little girl grew tired of watching her father dig in the earth, and taking a candle started to explore by herself. Being but five years old she could walk about upright and look up at the ceiling, and she saw on the ceiling what she took for the painting of a Bull. Her cries of "Toro! Toro!" brought her father to investigate, and thus the famous ceiling, covered with polychrome frescoes, was discovered. Other paintings and engravings are to be seen in the cave, but are less startling than the polychrome frescoes on the ceiling to the left of the vestibule.

Naturally the world was sceptical; it is almost incredible to us to-day; it was an impossible thought to the prehistorians of those days, who knew little of the wonders of the Upper Palæolithic civilisation; they did

not believe in the discovery and the frescoes of Altamira were practically forgotten.

In the middle of the nineties, a Frenchman, M. Rivière, began to dig in the vestibule of the cave of La Mouthe, near Les Eyzies (Dordogne). The deposits there form a series of stratified layers largely composed of Magdalenian cultures. As the material was removed, the entrance to a passage leading to a cave behind was discovered. This entrance had been blocked by the stratified deposits. Nobody, therefore, could have entered the cave behind, at a date later than that shown by the implements in the layers blocking the entrance. On the walls of the cave behind were found engravings and a few poor paintings. This discovery aroused considerable interest, and La Mouthe was visited by a number of eminent men who were convinced that the drawings there must necessarily have been made by folk living anterior to the date of the deposits which blocked the entrance. The authenticity of La Mouthe being accepted, M. Piette recalled the almost forgotten frescoes of Altamira. Search was started for further caves where Upper Palæolithic Art might occur, and a number were discovered, some of which contained frescoes

as fine as those at Altamira. Under the auspices of the Prince of Monaco a more or less thorough survey and study of this fascinating branch of prehistory was begun by M. l'Abbé Breuil, and the results have been published in a number of brilliantly written and profusely illustrated monographs. Should the reader still remain sceptical, the following further proofs of the authenticity of this art may convince him: —

1. Drawings and reliefs are sometimes found buried under deposits containing dateable stone implements, and are therefore earlier than these deposits. For example, the famous reliefs of Cap Blanc (*see* figure 12) were covered by the top portions of the Lower Magdalenian deposit which filled this deep rock shelter, and it is probable that these bas-reliefs were made by a man living at a time when the lower portion of this deposit was accumulating, viz., in very early Magdalenian times.

Another well-known instance is the cave of Pair non Pair, near the little town of Bourg-sur-Gironde, close to the rivers Dordogne and Garonne. When this cave was first discovered it consisted of a small chamber almost completely filled with earthy deposits.

An entrance was obtained by what is now a hole in the roof, and in the course of systematic digging lasting over a long period of years, M. Daleau removed layer after layer containing implements from the floor, until he finally reached the rock bottom of the cave. A new entrance was disclosed considerably lower down than the one used at first, an entrance which had been completely blocked by the deposits inside. In age, these deposits ranged from Mousterian to Solutrean, there being no layers of Magdalenian in the cave. As the layers were removed, exposing the walls of the cave, these were found to be covered by some poor outline drawings of animals. It is clear that they must be older than the deposits which cover them, the actual covering deposit being the one containing Upper Aurignacian implements. If they had been made by Middle Aurignacian Man the majority of them would have been low down, close to the floor, which is hardly likely, and it is but reasonable to suppose that they were made by Lower Aurignacian Man, in whose time they would be within easy arm's reach. But it is obvious that under no circumstances can they be later than Middle Aurignacian times, for after that date they were covered by deposits.

2. A second proof of the authenticity of the Cave Art is furnished by the conjunction of two facts, namely, that paintings or engravings are sometimes covered partially or wholly by stalactite, and that animals are often figured which no longer live in these areas. Stalactite is a calcareous deposit formed by solution of the limestone and its subsequent deposition on the cave walls. Its occurrence is erratic, depending on minute fissures in the porous limestone and the consequent percolation of water carrying carbonate of lime in solution to that particular place. If conditions are suitable, its growth is fairly rapid, though even thin layers may take ages to form should the conditions be unfavourable, and it can safely be affirmed that even under favourable circumstances it takes a number of years to deposit a comparatively thin layer. We can be quite certain, then, that a thick deposit partially covering one of our drawings proves that the latter cannot have been made later than (say) mediæval times. And now the second part of our argument comes in. It is only in our own days that anything has been known of extinct animals like the mammoth, and the mediæval peasant in the country (for

these caves are usually far removed from towns) knew nothing of such animals nor of bison and reindeer, which only survive to-day in distant lands under very different climates. These animals had migrated from France long before, at the end of Quaternary times, when the conditions suitable for their existence disappeared. Taking, then, these two facts together, we have a very clear demonstration of the Quaternary age of this art. Take the case of the fine group of the male reindeer approaching its mate (*see* figure 16). Engraved on the back of the remale reindeer is the figure of a mammoth (not seen in the reproduction). The reindeer group are therefore older than the mammoth, and must thus be of Quaternary age. Other proofs there are, but enough has been said to convince the reader that we are dealing neither with Roman nor Mediæval art, nor with modern forgeries.[1]

A word may be said about the destructive action of weathering in caves. This depends on the size of the opening and the consequent

[1] Forgeries can always be easily distinguished, for the patina of modern engraved lines is quite different from those on the rest of the cave wall, and in the case of paintings the colour has not sunk in and become part of the cave wall, as is often the case with the old art.

draughts produced, and may continue for a good way into the cave or hardly enter it at all. Near the entrance where the daylight penetrates and where mosses and lichens can grow, we should naturally not expect to find anything but perhaps very deeply cut engravings. Where condensation of water vapour on the walls of the cave, and its subsequent evaporation (produced by daily changes of temperature) has occurred, the walls are usually too corroded for anything to remain in the way of art. Beyond the limit reached by weathering the only danger we have to fear is the formation of thick layers of stalactite which would of course completely mask anything painted or engraved on the walls behind. No doubt many examples of the art are thus masked, but unless the percolation of lime is very heavy it is turned aside by the paintings, for the colouring matter was mixed with fat. Beyond the limit reached by weathering the temperature is constant, and the air, though usually fresh, is perfectly still. Perhaps what strikes the explorer most in the caves is the absolute silence; there is nothing like it on the surface of the earth, silence above ground being filled with sound though often

hardly distinguishable — the soughing of wind, the movements of animals or birds, etc. But when the explorer blows out his miner's acetylene lamp, and stands alone in the darkness, which seems well-nigh "solid," he will realise how it must have impressed primitive man, and how the cave conditions must have favoured the magic rites, for which, as we shall see later, the art was used. In those days lamps with wicks of moss and probably burning marrow or fat were used, and the light must necessarily have been very poor. One or two stone lamps have been found; one from the deposits of La Mouthe still contained a little carbonaceous matter, and the bottom was engraved with an animal. A broken fragment of the skull of an animal or some other suitable receptacle was no doubt generally used; skulls have been found carefully broken so as to form cups, and for lamps they would need hardly any preparation. The Eskimo lamp of to-day, with its moss wick and blubber, gives a fair light and but little smoke, and is probably not unlike those used by Prehistoric Man.

The painting materials used are iron ores, oxides of manganese, carbonaceous matter, and, very rarely, kaolin. The first of these,

when in the form of iron oxide, gives bright red, dark red, and chocolate; when in the form of carbonate, gives orange and yellow. Oxide of manganese is blue-black, and carbonaceous matter (which naturally is rather more ephemeral as a colour, being subject to oxidation) gives dead black. Kaolin is the white mineral used for making china; it is found in the earth in a few localities, but was hardly ever used as a pigment by Prehistoric Man. The iron and manganese ores are fairly common and are often dug up in the "homes," where they had been collected as little nodules and stored. The colouring of these ores is as permanent as the rock itself. The carbonaceous pigment could be easily obtained by the careful burning of bones. It is possible that other vegetable pigments were used of which no traces remain to-day, and of which therefore we know nothing, though but few animals require for their representation colours other than those already cited. The nodules of ore were powdered, and we have hollow bones closed at one end which once contained the pigment. This powder was mixed with fat (probably marrow), and bone palettes used for the mixing of colours have been found, palettes

sometimes carved into the shape of animals. We cannot say for certain how the colour was applied to the wall, but brushes made from the hair of animals would be easily contrived, or it may have been applied with the hand directly. Engravings were made with "gravers" (burins), while a heavy sort of scraper on a flake was the tool Man used for making bas-reliefs.

Only one example of modelling in clay is known at present, a group of bison in a cave at Tuc d'Audoubert. The bison are modelled in clay; there are also the marks of naked human feet in the cave, and an engraved harpoon on the floor. This cave is entered by boat, and one passes into a large chamber beautifully decorated by milky white stalactite. In one place there is a deposit of Magdalenian age, and elsewhere there are engravings. A passage, reached by a ladder and opening near the roof of this chamber, is then followed, leading after some distance to a long damp cave the floor of which is composed of clay. In 1912 the discoverers (the sons of Count Begouen) had actually to break a stalactite curtain to enter. The temperature never varies nor does the degree of moisture, and so we have a

combination of circumstances for preserving examples of what was probably a much practised art in Upper Palæolithic times — modelling in clay. The group consists of a male bison following a female; they are leaning against a rock, and near by is a small hillock of clay with an indication that a man has danced round it on his heels. At another point in the cave there is the impression of a naked human foot, left by some ancient Palæolithic hunter, for nobody since has entered the cave barefoot.

The following is a list of the animals figured on cave walls: Birds, Bison, Cave Bear, Chamois, Cave Tiger, Elk, Elephant, Fish, Hind, Horse, Ibex, Mammoth, Ox, Reindeer, Rhinoceros, Stag, Wild Boar, and Wolf. In the "Northern" group human figures are usually poorly executed, but in one place there is a man masked as a stag, with horns on his head, and a tail. Human hands are often painted on the walls, and there were three ways of representing them: "Negative," "Positive," or "Conventionalised." In the first case, the hand was placed on the wall and paint applied round it, the part covered by the hand remaining unpainted, and thus making the hand stand out against a coloured background. To make

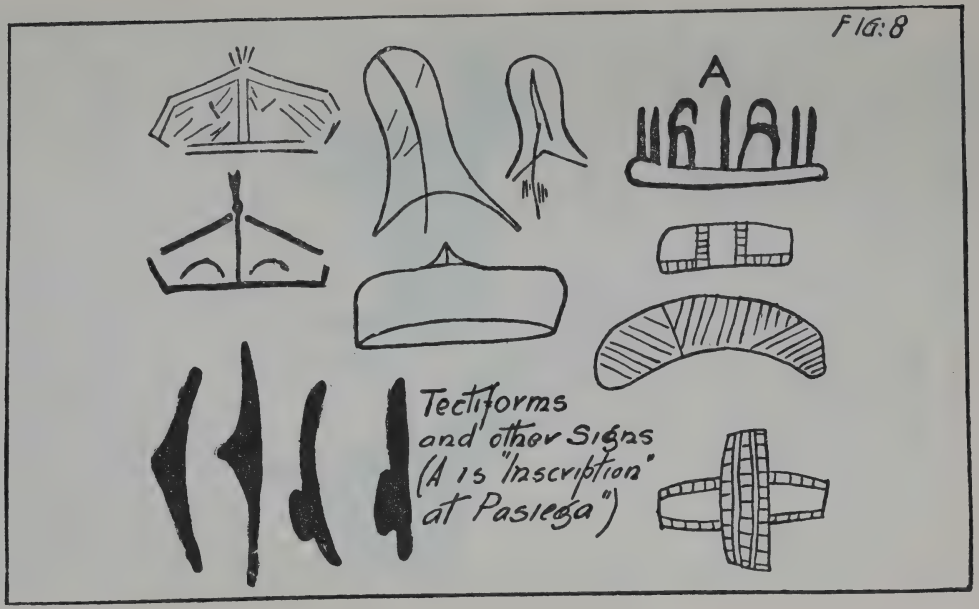


Fig: 8
A
Tectiforms
and other Signs
(A is "Inscription"
at Pasiega")

FIG:9

A: THIRD PHASE ENGRAVINGS IN SUPERPOSITION
(FROM TEYJAT)

B: SUPERPOSITION OF PHASES"
ORDER IN AGE IS:-
(1) RED OUTLINE PAINTING OF A RHINOCEROS' HEAD
(2) SHAPELESS FIGURE IN BLACK
(3) FIGURES IN "FLATWASH"
(4) FEEBLY POLYCHROME BISON
(FROM PONT DE GAUME)

a "Positive," the hand itself was dipped in colour and pressed on the wall. In the third case, the hand is represented by a horizontal line, from which are drawn five vertical lines. Modern primitive peoples often use representations of the human hand in their ritual, thus providing an analogy to the prehistoric painted hands. Finally, there are a number of signs of very different types, including punctuations and conventional figures, called tectiforms (perhaps meant to indicate some sort of construction) and club-like signs, etc., etc. Sometimes, as for instance at Pasiega, a number of signs are grouped together in what one would think was a sort of inscription.

The paintings and engravings vary in technique, and are not all of the same date, but the student must distinguish very carefully between what are called "Styles," and what are called "Phases." Paintings and engravings in the caves are often made one on top of another, in which case the one underneath is obviously older than the one next above. Suppose we find a technique A super-posed on a technique B in one place, and the technique B super-posed on the technique A in another, we should say that there was probably no very great difference in age

between the techniques. These techniques are known as "Styles," and are often quite local in distribution. If, however, we find that a certain "style" or group of "styles" is always underneath another "style" or group of "styles," and that this is true over widely separated areas such as Cantabria, the Pyrenees, and Dordogne, we can then definitely affirm that the first-mentioned "style" or group of "styles" is certainly older than the second. The first-mentioned "style" or group of "styles" is then said to belong to one "phase," and the second to another "phase" (*see* figure 9.) When we find two figures of the same "style" (or of different "styles," but the same "phase") in super-position, there must necessarily be some difference in date between them, but that difference need not be very great. But when on the other hand, we find two "styles" of different "phases," *viz.* two "phases" in super-position, there was probably a long interval of time between the making of the two figures. In practice, it is easy to determine the order of super-position of a painting and an engraving, but in the case of two engravings, unless one is deeper than the other, it is not so easy. Four distinct

"phases" have been recognised with perhaps a fifth at the extreme end of the Magdalenian or the beginning of Azilian times. The first of these "phases" is of Aurignacian, the latter three of Magdalenian date. The actual correlation of "styles" with deposits of dateable age can now and then be determined. Thus the engravings of Pair non Pair, which are all in one style, must be Aurignacian, and the reliefs of Cap Blanc not later than the end of Lower Magdalenian; for, as we have seen, in these cases the art is covered by dateable deposits, and must be earlier in age than the cultures which cover it. Another method of dating the art is by discovering a peculiar style engraved both on the cave walls and on fragments of bones, when these engravings are only found in layers of a known date. For instance, the engraving of the hind-quarters of a horse found in the cave of Hornos de la Peña, is similar in technique, and, indeed, in proportion, to a small engraving of a horse in the vestibule of the same cave. As the bone with the engraving of the horse was found in Aurignacian deposits, we should, therefore, say that the horse engraved on the wall was also Aurignacian in date. This is confirmed when we find

that the style of this early engraving coincides with that of Pair non Pair, and still more with the engraved figure of a bison (*see* figure 10) in the little cave of La Grèze (Dordogne), which was completely covered by deposits containing Upper Aurignacian and Solutrean implements. In Cantabria there is a very peculiar "style," to be assigned to "phase" 2, judging by superpositions, which is often used in the engraving of hinds on the walls of Castillo (*see* figure 13). Fragments of bone engraved with hinds in the same manner were found in the Lower Magdalenian deposit at the entrance to Castillo itself. It is, therefore, safe to assume a Lower Magdalenian date for this particular "style," and so for the "phase" of which the style is an illustration. When a few such definite correlations with deposits are obtained, we have some clue to the relative date of the various techniques of this Cave Art.

From the practically complete absence of "Home" art in the Solutrean deposits, it has been argued that the Solutreans did not practise any art. The first "phase" is Aurignacian; the second Lower Magdalenian; the third and fourth being Middle and Upper Magdalenian. The reader need

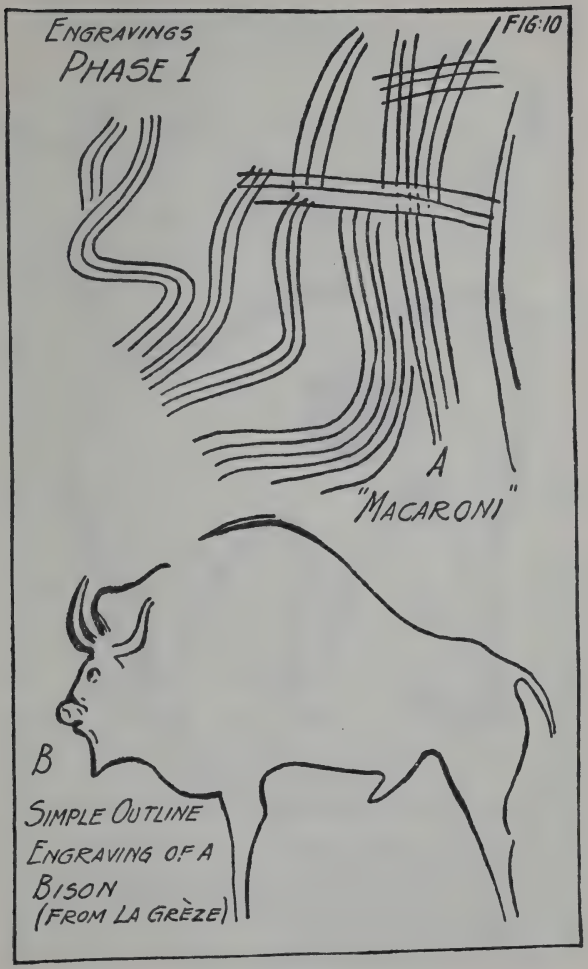
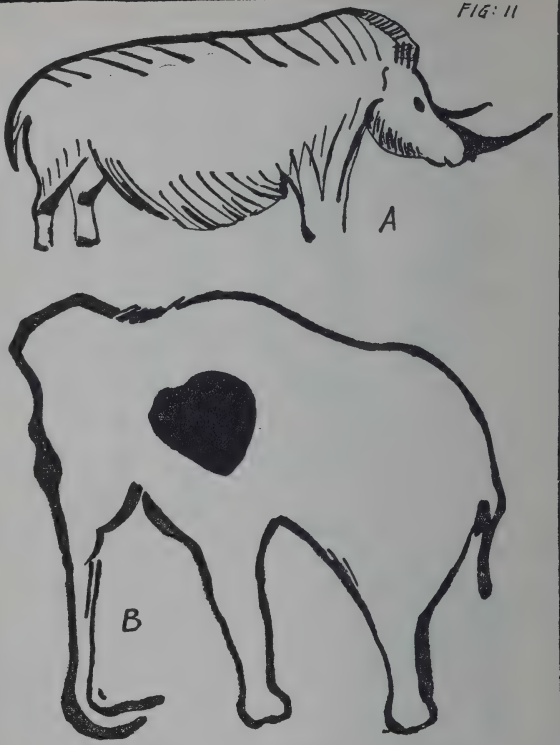

ENGRAVINGS
PHASE 1
FIG:10
A
"MACARONI"
B
SIMPLE OUTLINE
ENGRAVING OF A
BISON
(FROM LA GRÈZE)

FIG: 11



PAINTINGS. PHASE 1

A: RHINOCEROS, PAINTED IN RED, DATING FROM END OF PHASE 1
(FROM FONT DE GAUME)

B: ELEPHANT (? ELEPHAS ANTIQUUS) DATING FROM BEGINNING OF PHASE 1
(FROM PINDAL)

not be reminded that the sequence of the "phases" is always constant wherever the art occurs — if, by superposition "phase" A is found to be older than "phase" B in one place, this will hold good in every locality.

Two branches of Art have to be considered: (*a*) Engraving, and occasionally sculpture; (*b*) Painting.

Aurignacian Age. Phase 1 (*see* figures 10, 11, 12). The earliest form of engraving is very primitive. It consists of more or less parallel and wavy lines, probably first made by fingers on clay walls, and then later on with pronged implements on harder surfaces. These designs are known as "Macaroni," and we know nothing of their meaning. They remind one of the marks made by Cave Bears when sharpening their claws on the cave walls, and so possibly this animal may have suggested the design to the artist. Following on this form of engraving, and not much later in age, come the first simple engravings of animals made by wide, deep, continuous incisions; sometimes made with a "graver" on lime stone walls, sometimes with the finger when the walls were soft; the animals always show vigour, even when it is difficult to decide the exact interpretation.

It is worthy of note that although only two legs are indicated, the animal being shown in profile, the horns are represented as if viewed full face. As a rule, all smaller details are omitted. But towards the end of the first "phase" the technique greatly improved, especially in north Spain, where often all four legs of the animal are shown. The eye is generally drawn almond-shaped.

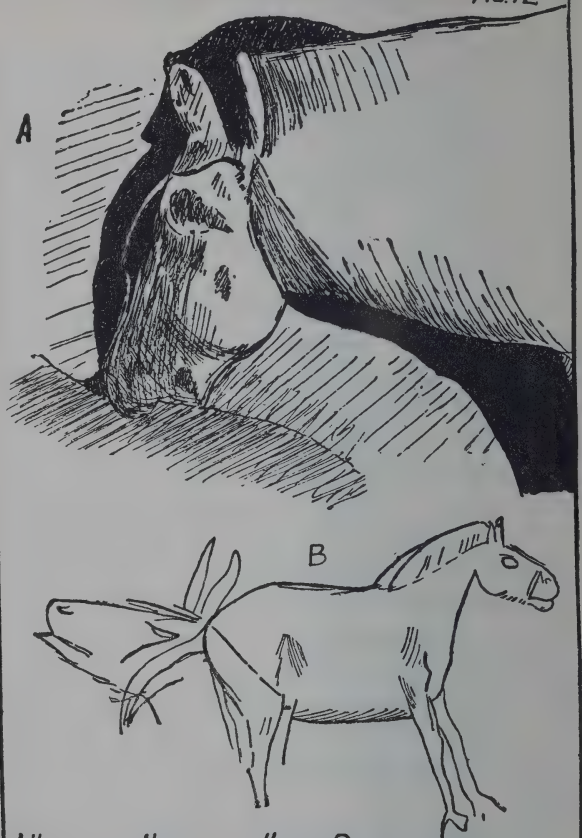
Painting, like engraving, started with very primitive designs, resembling the "Macaroni," and such designs are found accompanying simple outline animal figures in the cave of La Pileta. One of the first models to be painted was the human hand, either "negative" or "positive," and then followed outline animals. At first the paintings consisted of simple black, red or yellow lines, occasionally of simple dotted outlines, and the object represented is not always recognisable; but these primitive efforts were succeeded by good line tracings in monochrome of animals in silhouette, showing as a rule only two out of the four legs, and no modelling. A study of the early paintings of Pasiega shows two "styles" of slightly different dates, but both belonging to the first "phase."

Lower Magdalenian Age. Phase 2 (*see*

figures 12, 13, 14). In engravings of this age there is more life in the drawing; the outline of the animal is no longer formed by a single continuous line, though the figures are often awkward and badly proportioned. The horns were usually drawn in perspective, and a good deal of attention was given to the drawing of the legs of the animals, which have a much less stiff appearance, and the hoofs are often very carefully rendered. As time went on the line grew less wide and deep, but gained in exactness. Though the proportions of the whole are not always perfect the outline is generally excellent and carefully correct. The body of the animal is occasionally covered with scratches indicating fur, or the more hairy parts are emphasized by serried cuts. High and low reliefs of "phase" 2 age are known, and attempts to represent three dimensions in various ways are observable. In Cantabria, there is found a special "style" in "phase" 2, an outline drawing of the animal being completely filled in with fine lines.

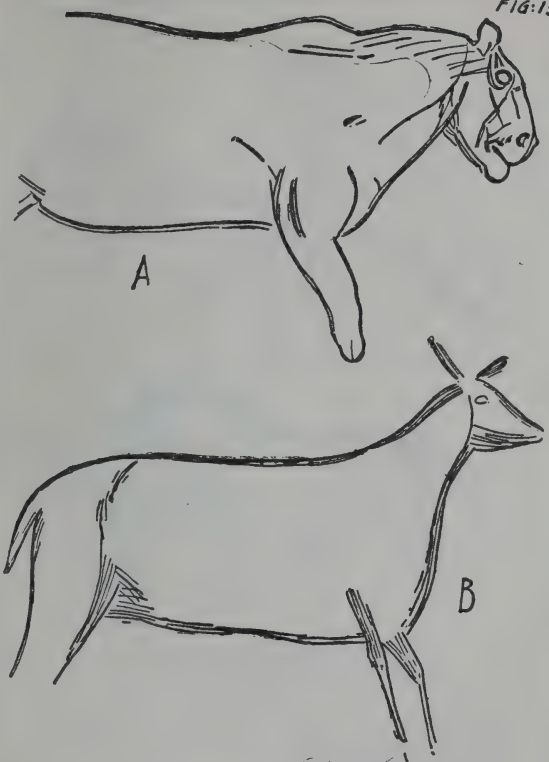
Painting still consisted of simple outline in black or red line, but the line was often uneven in width, broadening to indicate the shadows, the animal's joints, or the places

FIG:12



A: Horse's Head in High Relief, from Frieze at Cap Blanc = Phase 2 Age
B: Engravings Dating From End of Phase 1 (From Hornos de la Peña)

FIG:13



ENGRAVINGS PHASE 2.

A: CAVE TIGER (FROM COMBARELLES,

B: HIND, ILLUSTRATING SPECIAL CANTABRIAN STYLE OF PHASE 2 (FROM CASTILLO)

FIG: 14

PAINTINGS. PHASE 2.

A: OX IN THE PUNCTUATION STYLE OF CANTABRIA (FROM COVALANAS).

B: HORSE IN MODELLED STYLE (STUMP DRAWING) (FROM FONT DE GAUME)

where the hair grew thickest. This is the time when shading first begins; the colour was put on fairly thickly and cleverly manipulated, so as to shade the animal's coat and members. Towards the end of this "phase," and increasingly in the succeeding "phase," engraving is combined with painting. The artists grew to understand more and more the management of colour; there are well-painted, well-modelled representations of animals in a black medium, which remind one rather of charcoal stump drawings. In some cases the outline is engraved, and the high lights taken out by scratching the paint.

If the outline is not drawn by a continuous line, it is done by a series of dots and punctuations, these dots being often of uniform shape which suggest their having been made by a sort of stamp. This "dotted" method of drawing, which is often found in Cantabria, appears to be of rather earlier date than the "modelled" style produced by shading.

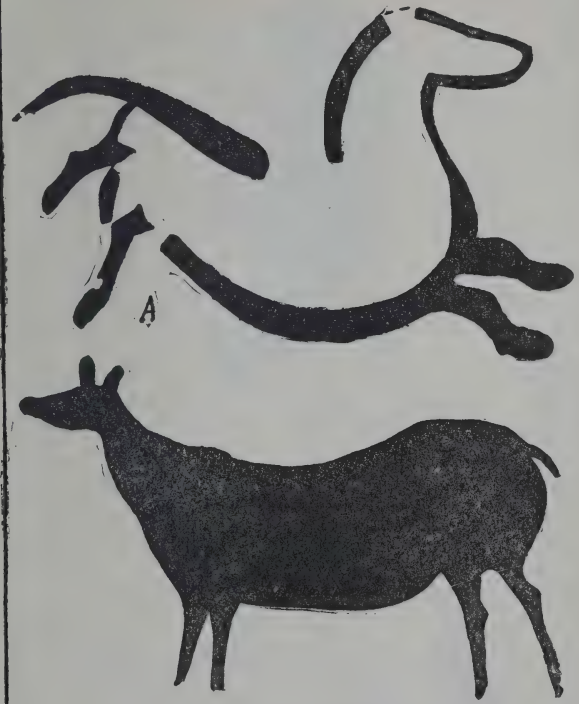
Sometimes where a boss of stalactite on the rock wall suggested roughly the figure of an animal, the resemblance was completed with paint, an eye or a horn being added by the artist to emphasize the natural peculiarity.

Middle Magdalenian. Phase 3 (*see* frontis-

piece, also figure 9, engravings from Teyjat, and figure 15). Though the wall engravings of this phase are generally small, and the lines less deeply cut than in those of the preceding phase, the outline is clear and well-drawn. The body of the animal is sometimes covered with engraved lines, but these are not fine and neatly executed as is the case in the special Cantabrian "style" of "phase" 2. Painting and engraving are often combined. The painters of this age completely destroyed the modelling of their animals by using colour to excess. They filled in the outline with paint, thus producing a uniform wash, a far more primitive manner of painting than that exhibited in the earlier designs. They had also in some cases the unfortunate idea of covering the surface of the animal's body with evenly distributed red or black lozenges after the outline of the creature had been drawn (Marsoulas). The effect was not beautiful. The "punctuated" style in Cantabria degenerated into a rough broad outline.

Upper Magdalenian. Phase 4 (*see* figure 16). The firm clear line which the earlier engravings possessed degenerates in this age into mere scratches very difficult to decipher. The artists exaggerated detail, as at Font de

FIG. 15



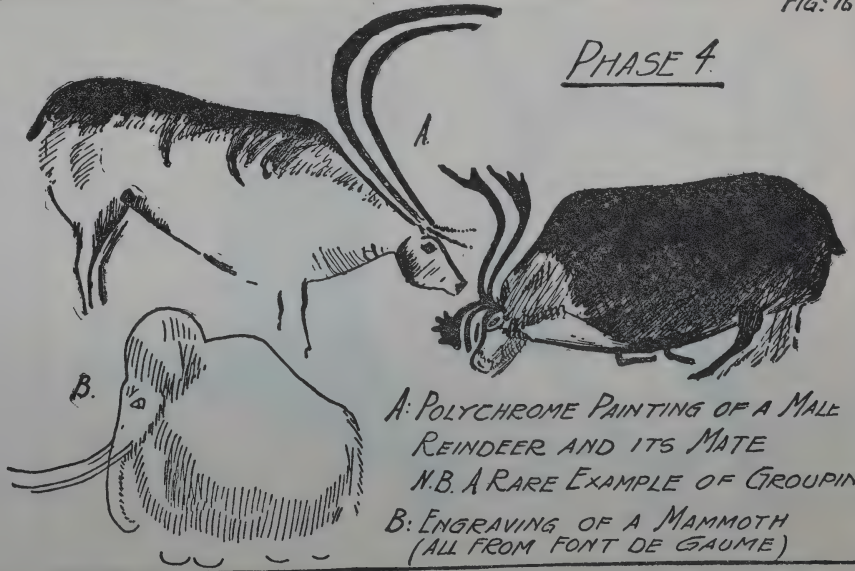
PAINTINGS. PHASE 3

A. HORSE IN COARSE OUTLINE DERIVED FROM PUNCTUATION STYLE (FROM ALTAMIRA)

B HIND IN RED "FLAT WASH." (FROM PASIEGA)

FIG: 16

PHASE 4



A: POLYCHROME PAINTING OF A MALE REINDEER AND ITS MATE
N.B. A RARE EXAMPLE OF GROUPING.

B: ENGRAVING OF A MAMMOTH
(ALL FROM FONT DE GAUME)

Gaume where the fur of the engraved Mammoth is over-emphasised at the expense of the clarity of the design. This exaggeration of detail usurps the place of expression and general harmony, and the animals begin to be stereotyped, though not unpleasing. Again, there is sometimes almost an idea of "impressionism;" for example, the feet of the Mammoth at Font de Gaume are not joined to the legs of the beast, though the right effect is produced on the observer.

By the use of several colours the painters of this age tried to recover the art of modelling which they had lost in Middle Magdalenian (3rd phase) times. On animals painted in brown or red they added hoofs, eyes, manes, and horns in black. Later, drawing the silhouette in black, they modelled the body by shading it in all the various tints obtained by mixing red with black, and occasionally called in the help of engraving for the outline, and to emphasise details; whilst scratchings and shading marked the articulations. As technique advanced, the animals, especially the bison, became more conventionalised. To this date belong a number of the tectiforms, signs, and conventionalised hands.

Extreme end of the Magdalenian, or the

Azilian Age (*Phase* 5). There are no wall engravings. What paintings there are (and they are very few in number) recall the painted pebbles of Mas d'Azil. In only one cave (that of Marsoulas, Haute Garonne) are any paintings of this age to be found, and this painting consists of a long red barbed line, lines of dots, and a design of a cross in a circle. These are clearly the latest paintings of this cave. Some of these signs were probably derived from rather similar signs of an earlier age, such as are found painted on the walls of Castillo, Niaux, and amongst the older series of paintings at Marsoulas itself.

Eastern Spanish style. On the eastern side of Spain a decorative art has been found, probably of Quaternary age, the style of which is quite different from that of the "northern" group. The conditions under which the paintings are found are also different, for the pictures of this eastern Spanish style decorate the walls of comparatively shallow rock shelters, instead of occurring in deep caves. Limestone is necessary if the country is to provide deep caves, but for rock shelters this is not the case. Though rock shelters are most easily formed by the weathering of limestone, they do occur in sandstone,

and even in schist. Limestone rock shelters are, however, the most convenient, and they were generally the ones chosen by the folk of east Spain at this period for their pictorial art. Weathering can penetrate to the back of rock shelters, and but for the fact that the eastern Spanish group occurs in the dry areas of east Spain there would have been but little chance of their preservation. The limestone of south Spain is largely covered by a grey lichen, which requires a certain amount of moisture for its growth; it is destructive to the paintings, for the walls incline to scale off by the action of the minute roots of the lichen. Anything in the nature of a moss holds water containing carbonic acid in solution, and this sets up a chemical action which destroys the limestone wall. It is only, therefore, in the case of rock shelters where moisture does not penetrate, and mosses and lichens cannot grow, that we can hope to find anything in the nature of pictorial art. Rock shelters which are worth the attention of the explorer can often be told from a distance, for where the limestone has not been covered by lichen, the small quantity of iron which it contains has become oxidised and the walls are of a reddish brown or yellowish colour.

As far as is yet known, the distribution of this group of paintings extends from almost in sight of the Pyrenees to the north, down to almost in sight of the Mediterranean in the south; while the westerly extension of the art into Spain never exceeded more than about sixty miles. The most famous localities are perhaps Cogul, some miles south of Lérida, with its group of dressed women (*see* figure 17) around a central male figure; Barranco del Valtorta, in the province of Castellon, with the group of hunting scenes, in one of which animals are being driven on to a line of archers; Alpéra, in the province of Albacete, with its multitude of animal and human figures, some of the latter adorned with plumed head-dresses (*see* figure 17); Cantos de la Visera, not far from Alpéra, which shows, amongst others, paintings of horses and birds; and lastly, Minateda, with its hundreds of beautifully painted animals and men, some of which seem to be taking part in a battle scene.

The technique of this Eastern Spanish group is totally different from that of the "northern" group, and exhibits two very distinctive qualities. Firstly, the occurrence of paintings of human beings, often armed

FIG. 17

A: WOMEN
(FROM COGUL)

B: RHINOCEROS
(FROM MINATEDA)

C: HUNTER
(FROM ALPERA)

D: STAG AND HUNTER GROUPS
(FROM ALPERA)

E: ELK'S HEAD
(FROM CUEVA QUESO NEAR ALPERA)

with a bow and arrow, and secondly, the portrayal of definite scenes. As an example of a scene we might take the kneeling hunter at Alpéra, armed with bow and arrow; he faces a stag, which defiantly puts out its tongue; a little above we see a further group where arrows have flown and a stag transfixed walks sorrowfully away (*see* figure 17). The human beings are usually more conventionalised than the animals; even the clothed women of Cogul cannot be described as naturalistic. Another small peculiarity is the extreme rarity of engravings in east Spain, though they are so frequent in what we have called the "northern group."

A few words are necessary as to the authenticity of these paintings and their correlation with the northern group. It has been claimed that the presence of scenes denoting a highly-developed culture such as the one already described from Barranco del Valtorta are hardly compatible with Upper Palæolithic times; also that the existence of this group of paintings only in the east of Spain, and the presence in it of robed women, would suggest some connection with the later Neolithic and Bronze Age cultures of the eastern Mediterranean. Further, it is urged that the occurrence

of this art in rock shelters fully exposed to daylight and weathering, would not have survived from Quaternary times. Those who hold that these paintings have been made in Upper Palæolithic times counter the first two arguments by saying that the art was produced by a totally different people in a different stage of culture from the people who made the so-called "northern group." The third argument is answered by the fact that this art only survives in dry areas, and the colours of the iron oxides with which the paintings were made are as permanent as the rock itself. It should also be remembered that those who accept the shorter chronology do not claim that there were untold æons of time between ourselves and Upper Palæolithic Man. One great clue to the date of this art lies in the fact that a certain number of Quaternary animals are figured, animals that have not lived in the areas where the paintings were found since Quaternary times. For example, there is a bison at Cogul, an elk (*see* figure 17) and a chamois in two small rock shelters close to Alpéra, a rhinoceros (*see* figure 17) and a reindeer at Minateda. It is difficult for those who believe in a later date to answer this argument.

An actual correlation with the "northern group" is at present difficult, or nearly impossible. But at Pasiega (Cantabria), and at Portel (Pyrenees), caves in the northern area, there occur paintings of stags' horns, the technique of which strongly resembles those of the Eastern Spanish style. Again at Portel there is a little red painting of a horse, similar in many respects to those figured at Cantos de la Visera in the Eastern Spanish group. Whether or no this Eastern Spanish group embraced a long period of the Upper Palæolithic Age, or only lasted for a time equivalent to the latter Magdalenian period of France, remains to be demonstrated. The occurrence at Minateda of a large number of superpositions of slightly different styles, inclines one to postulate a considerable length of time.

A perfectly different and highly conventionalised art also occurs in Spain, which can be more or less dated as being of Neolithic or Eneolithic age. Examples of this art (known as Spanish group 3) are sometimes found in the same rock shelters as the paintings of the Eastern Spanish group 2; but the reader should note that in every case where chance super-position of the two groups occur, examples of the Spanish group 3 are

always painted over examples of Eastern Spanish style. There is therefore no doubt that the naturalistic paintings of the Eastern Spanish style are older than the Neolithic or Eneolithic paintings of the Spanish group 3.

But more important than any details is the broad fact that certain peoples of the Palæolithic age, living in such very primitive conditions, people who had no knowledge of metal, of agriculture, nor of domestic animals, had a real genius for painting and sculpture, and practised it on the objects surrounding them in daily life, as well as on the walls of their mysterious caves, and in the more shallow rock shelters. We, who have been accustomed to think of these people as little more than wild beasts, hunting and killing to feed and clothe themselves, find that they boasted a band of artists whose paintings and sculptures many an artist of to-day may admire, and, given the same materials, would fail to rival or even equal.

CHAPTER X

MOTIVES FOR THE ART

No doubt the reader has for some time been asking himself if it is possible to discover any motive for the production of all this wonderful art which we have been considering. Why did Man fifteen thousand years ago take the trouble to sculpture and engrave the beautiful little bone and stone objects that are found in the deposits? Or, again, why did he take the trouble to penetrate into deep caves, sometimes for more than half a mile, in order to emblazon the walls with wonderful polychrome frescoes, as at Altamira, or with the almost equally beautiful line paintings at Niaux? And for what reason were the rock shelters of east Spain decorated? Why should there be a painting of a hunter opposite a stag, which puts its tongue out at the assailant; while, above it, a second picture is shown, where a stag, transfixed by an arrow, walks sorrowfully away?

In this chapter we reach what is perhaps one of the most interesting branches in the whole subject of Palæolithic cultures. It is only through the art that we are enabled to lift a corner of the veil that hides from us the thoughts, feelings, ideas, emotions, in a word, the psychology of these primitive folk who lived so long ago. When we consider their industries and their skeletons, we are sometimes able to discern dimly the movements and migrations of various tribes and races. When we excavate their "homes" we can picture (imperfectly no doubt) how they lived and under what conditions; but it is only in the Art that we get a glimpse of that essentially human attribute, the Mind.

It will be best to divide this chapter into three sections, the first one dealing with the motives for the Cave Art, the second with the motives for the Home Art, and the third with the motives for the Art found in the Eastern Spanish group rock shelters.

Cave Art. As far as can be seen, there are three, and only three, conceivable motives for the Cave Art:

(*a*) Decoration, in which may be included permanent records of successful hunts.

(*b*) The desire for self-expression felt by artistic natures.

(*c*) The requirements of Magic or ceremonial ritual.

If (*a*) be taken as the motive, the Art will have to be considered as a sort of wallpaper, something that would please the eye of an artistic people, and it would be found in places that they frequented and lived in. This "wall-paper" might well consist of hunting scenes, or of specially fine trophies of the chase, something that the artist hunter looked back on with pleasure or commemorated with pride.

Taking (*b*) as the motive, it might be urged that, whatever else prehistoric Man in Western Europe was, he was essentially artistic, and was compelled to express his emotions. Consequently, certain tribes, in certain areas, painted pictures of what chiefly occupied a hunting people, *viz.* game, and that in a few cases, under certain conditions, these pictures have survived to our own day. We must assume that other tribes in other areas may have found a vent for their emotions in other ways, such as carving in wood or dancing — neither of which would leave any surviving traces.

If we take (*c*) as motive (and we shall see it is the only one that really fits the case) we assume that this Art was almost wholly connected with matters of sympathetic magic or ceremonial ritual. It cannot be denied that Upper Palæolithic Man was naturally artistic; this is quite obvious from the drawings. All that is suggested is that primitive Man universally practised some form of sympathetic magic or ceremonial ritual, and that in Western Europe, among an artistic people, it took the form of pictorial representation. There may have been other forms of artistic expression, but of these we know nothing.

In order to examine these suggestions, let us take a walk through a few of the painted caves; we shall then be able to see for ourselves how far any of these theories fit in with what we actually find in practice.

Let us go through the cave of Font de Gaume, near Les Eyzies (Dordogne). The cave opens on the precipitous side of a small valley, and consists at first of a fair-sized tunnel, the walls of which have been much corroded by the weather. At a certain point the passage is almost completely blocked by stalactite growth; beyond this point weather-

ing has had but little action. Both walls are here covered with paintings, many of them in Polychrome. Continuing to the end of the cave we find a narrow fissure, so narrow that we have to enter sideways, and the entrance has now been closed to the general public by a gateway, to prevent excessive rubbing of the walls by mere tourist visitors. We will edge our way in for about ten yards, when we reach a point where, with some difficulty, owing to the narrowness, one of us must climb on the shoulders of a friend in front, in order to see high up on the left hand wall a painting in red of a rhinoceros (figure 11). It is impossible to see this painting properly, still less to photograph it, without the help of mirrors, for the fissure is so narrow that one cannot get far enough back really to enjoy it. It cannot be argued that the floor of the fissure has sunk since Palæolithic times through the removal of earthy material by water action, for we find other examples of Palæolithic art with the same technique, only a foot or two above the present level of the ground. If this is mere decoration — a "wallpaper" — a queer place has been chosen for it! It is difficult enough to see it to-day, but in early times with inferior lighting, it must have

been less visible. Incidentally, Man never did live in the end of deep caves; he suffered as much from rheumatism as he does to-day, and caves are by no means water-proof. Even compact limestone is porous. The explorer may arrive at the entrance to a cave on Monday through pouring rain, and flinging off his mackintosh, will congratulate himself on being dry and under cover. Should he return to that cave in the brilliant sunshine of the following Thursday, he will find that the rain which fell on the hill top on the previous Monday has meanwhile soaked through, and it will be raining hard in the cave. Nor can we imagine, that the rhinoceros has been painted by a man who desired to "express" himself; at least, it is a very different mode of expression from that which even the most artistic would use to-day. It seems, to say the least of it, irrational that a human being, who felt he had to paint a rhinoceros, should light his inferior lamp, plunge into a deep cave, worm his way into a fissure at the end, scramble up to a height of about ten feet above the ground, either on a friend's shoulders or else by means of accidental foot and hand holds on the wall! Indeed, having "expressed" himself, he can

neither properly see his painting himself, nor show it to his friends. On the other hand, there is nothing in it antagonistic to the idea of sympathetic magic.

Let us now see what we find at Teyjat, also in the Dordogne but some distance from Font de Gaume. Teyjat is a small cave discovered some years ago, and on the left-hand side, a little distance from the entrance, there is a block of stalactite. This has provided an excellent surface for Magdalenian Man's engravings amongst which is the group of animals shown in figure 9. Why should Magdalenian Man have engraved animals with the same technique at or about the same time, one on another, though bearing no relation to each other? Teyjat is by no means an isolated example — the same thing happens at Combarelles, and in many other caves. A super-position of phases is easily understood; there was probably a considerable lapse of time between the phases super-posed, but it is a strange notion of decoration — even as a record of the chase — to make engravings of animals one on top of the other higgledy-piggledy. Again, a man trying to "express" himself would be likely to choose a fresh "canvas," of which there is no lack in the

large caves; although it is true that good "canvases," that is areas of walls, which are smooth and suitable, are by no means as common, even in large caves, as the reader might think.

Let us turn to a cave in the Pyrenees called Gargas, the entrance to which was only unmasked comparatively recently. In the vestibule are found deposits of Mousterian and Aurignacian cultures. The cave consists of a number of chambers, and in one place there is just such a panel (of phase 1) as I have described at Teyjat. An infinite number of poor engravings have been made one on top of another to such an extent that it is the work of weeks to disentangle them. Besides this, the walls of Gargas are in many cases covered with representations of negative human hands, that seem to have lost one or more joints of one or more fingers. A number of primitive peoples still mutilate their hands in this manner by the removal of joints, in order to avert or propitiate evil. Did the same idea exist in Upper Palæolithic times, and have we an example of it at Gargas? At any rate mutilated hands are a curious kind of decoration, and a still queerer form of "expressing" oneself. On the other

hand, neither the palimpsest nor the hands are antagonistic to the idea of sympathetic magic.

The cave of Pasiega opens on the steep side of the conical limestone hill above Puente Viesgo, some miles inland from Santander (North Spain). The passages are very small, and the cave itself is a veritable labyrinth. There is not even a vestibule where Man could have lived, and where his deposits could have accumulated. In a little chamber filled with engravings and paintings there is a stone throne like a large armchair, partly natural it is true, but partly artificial, on which when the chamber was first discovered a chipped limestone implement was found. It is clear that there is some connection between this throne and the painted and engraved chamber in the heart of the mountain in which it stands, and the natural explanation is that they both served for some ceremonial ritual. Again, the occurrence of strange signs, often hidden in the darkest and least accessible recesses of the cave, must not be forgotten. Their meaning is obscure and probably manifold; some were possibly tent-like constructions, others may have been meant to represent traps for catching big

game in the form of pits dug in the ground, and covered with boughs, etc. Others, from their position, seem to have been meant for some symbolic inscription, perhaps a notice prohibiting further advance except to the initiated, etc.

In one case, the cave of Bolao, there seems to be a connection between tectiforms and water; in another, at Castillo, these tectiforms are painted in a sort of small naturally formed apse, behind a natural altar. The tectiforms argue strongly against the " decoration " or " expression " theories, but are in complete accord with a magical significance.

Finally, if the reader will come, in imagination, and explore the cave of Trois Frères, he will see that magic and some sort of ceremonial ritual is the only possible explanation of the wonderful Cave Art. The cave of the Trois Frères is in the lower slopes of the Pyrenees, not far from the town of S. Girons. The entrance to it is like a sort of rabbit burrow at the end of another cave called Enlène. For some distance the going is difficult until the passage divides into three. Only a few examples of Art are to be found in the right-hand and middle passages (human hands and punctuations). In the

left-hand passage is one of *the most striking exhibitions of Palæolithic Art*. The explorer passes by a small alcove on the right, where under an engraving of a lion a graving tool was found on a projecting knob of rock, probably the actual one used for engraving the lion. Soon after the ground slopes steeply down and ends in a sort of alcove, and here we have the most startling presentment of Palæolithic Art. The vertical walls to the right and left and in front are crowded with engravings of all kinds of animals. There are Bison, Horse, Lion, Mammoth, Reindeer (in all postures), Rhinoceros, Cave Bear, etc. The engravings, which are very well done, occur up to a height which can comfortably be reached by an ordinary man. The wall in front is pierced by a low tunnel on a level with the ground, the hole being quite natural, the result of water action. The engravings continue on the walls and ceiling of this tunnel. Beyond the tunnel the passage turns to the right, and slopes steeply up, to re-emerge as a sort of window overlooking the alcove already described, at some twelve feet above the floor level. Anyone standing at this window dominates the frieze of engravings below, and any crowd of spectators who come to look at these engravings. To

the right of a person standing in this window, and at the same level, and so dominating the alcove below, is the figure of a man masked as a stag. The feet are human, but the head has obviously been covered by a stag's mask with antlers. There is also a tail. The figure is partly painted, partly engraved. It can be reached by getting out of the "window" and performing some acrobatic feats. Not only is the figure itself important, but its position, alongside the "window" or "pulpit," dominating the frieze of engravings and any spectators below, is still more important. Definitely masked humans have not been discovered elsewhere in the Cave Art, although they are known in the Home Art.[1]

From the above it would appear that the only explanation of the art that fits the case is that it was connected with some form of sympathetic magic and ceremonial ritual. It will, therefore, be necessary to consider in greater detail what we mean by this.

Studies of both human psychology and of modern primitive peoples aid us to a certain

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[1] Men masked as chamois occur on a perforated bone staff from the rock shelter of Mège, France, and there is the figure of a man masked, apparently as a stag, on a piece of schist from Lourdes.

FIG. 18

A: ENGRAVED BISON WITH ADDITIONS IN POLYCHROME. DATES FROM END OF PHASE 3 OR BEGINNING OF PHASE 4. NOTE THREE WOUND HOLES (FROM PINDAL)

B: "PAINTED PEBBLES" OF AZILIAN AGE.

FIG: 19

A: "SORCERER MASKED AS A STAG
(FROM TROIS FRÈRES)

B BISON WITH ARROW PAINTED IN BLACK
(FROM NIAUX)

extent in this research. For a human being two things exist, himself, and the world outside. When he perceives outside circumstances he reacts to them. Thus a man puts his hand in the fire, perceives it is hot, and there is an almost instantaneous reaction to remove the hand from the source of discomfort. If reaction followed instantaneously on perception Man could have no mental history: he would be an automaton. But there is often delay between perception and reaction, in some cases voluntary, in others involuntary. It is during this period of delay that all abstract ideas, including those of the supernatural, are conceived. As has been already stated, the delay may be voluntary; for example, a man running a race may be dead beat and yet does not stop and rest. A man may be hungry and yet will not eat till dinner is served. Or it may be involuntary, for the man may be hungry, but there may be no food in the house. Or rain may be desired for the crops, but the weather remains fine. This involuntary delay between perception and its corresponding reaction we share with many of the higher animals. Thus a hungry lion may roam the jungle but fail for a long time to make a kill. However, in the case of

mankind, there acts during this period of delay a sense which wild animals do not apparently possess, and which, for want of a better name, we will call conscious intelligence, or rather a consciousness of self-existence. The result in the case of primitive peoples is generally found to be symbolism. Why the pent-up emotion caused by delay should issue, as it does with many primitive peoples, in mimetic representations of the things desired, cannot, as yet, be determined, but the fact remains. The most usual form of mimetic representation is the masked dance, individuals being dressed up in the form of the objects which it is desired to influence. Thus men will be masked as the animals which they wish to capture or make more prolific. Symbolism starts at first with naturalistic representation, and is especially potent if some actual portions of the animal which it is desirable to influence are incorporated in the representation. For example, if it is desired to influence a human enemy, an image of him is made with the parings of his nails or a piece of his hair incorporated, which is then burnt over a fire or stuck with pins. It is believed that by this means the actual human being will feel the hurt, this

result being more sure if the ceremony is performed by a properly accredited medicine man. The scientific explanation behind it all is, of course, suggestion: the doomed man comes to know that the powers that be have performed these antagonistic rites, and that there is no longer any hope of saving his life. Many a savage has been known to have been thus killed by suggestion.

In the same way, if an elaborate hunting dance has been performed, the hunters feel they will be successful in their hunt, and probably are so, because they have more self-confidence. This may well be true in the case of hunters, but must obviously be less so in the case of agriculturists, for no amount of magic ritual will really make any difference to the crops, or cause the rain to come when desired. When we find, therefore, the Macedonian peasant throwing up his spade and saying, "Flax, grow as high as this," and really believing it will happen, we may suspect that the ideas of sympathetic magic involved have been inherited from the ideas and feelings of an earlier purely hunting civilisation. After a time a certain decadence sets in; the symbolism no longer requires a naturalistic image, and the object which it is

wished to influence can be represented by a symbol, perhaps a word.

There is, therefore, good reason for thinking that the naturalistic representation of the animals, most of them required for food, which we find emblazoning the walls of our caves, were connected with this early kind of symbolism. More especially is this the case when we see arrows carefully painted on the animals in vulnerable places, as in the long cave at Niaux, where we have to penetrate half-a-mile before reaching the paintings. Here we find bison with arrows painted or engraved on their flanks. In one case, there are three small natural cup-like hollows in the ground under an overhanging wall. Prehistoric Man noticed this, and, engraving a bison round them, indicated the three wound holes with little arrows. It would seem, indeed, more than probable that the paintings were made with the idea of obtaining an influence over the actual animals; in most cases, no doubt, it was to ensure a successful hunt, though the possibility that sometimes they were made to influence the animals to be more prolific must not be forgotten. Figures of animals not suitable for food are very rare, and may have been made with the

object of getting rid of dangerous beasts in the vicinity.

Can we go a stage further? Here we enter the realms of pure hypothesis, but the position of the figure at the Trois Frères is very suggestive. Masking as animals was no doubt a definite means of approaching, and so of killing, game. The Bushman paintings of an ostrich hunt, where one of the ostriches is seen to be a man with bow and arrow disguised as an ostrich, is an example of this. But the masked figure of Trois Frères, alongside the " window " or " pulpit," dominating the frieze of engravings and the spectators below, strongly suggests a sanctuary, where ceremonial ritual was performed above, and witnessed by an audience beneath. It should be noted that the Cave Art must have been the work of an artistic medicine man caste; this is proved by the similar changes of style over wide areas occurring at the same date, and will be more fully discussed presently.

In tribal life, mimetic representations appear at first to take the form of collective ritual for those concerned; but it is a known fact, as has been shown in the early Greek spring festivals, that collective ritual falls

into the hands of professionals and the ordinary man degenerates into a spectator. Finally, the actual ritual may lose its significance, representations pleasing the spectator, but no longer having any magical or ceremonial significance, may be introduced, and real drama develops out of what had been magical collective ritual. Such would seem to have been the origin of the great Greek tragedies which appear to have grown out of the spring festivals; the time of year, the place, and a sort of religious atmosphere remain, though actual ritual connected with the spring dances has been dropped, and scenes from the heroic period substituted. Again, it seems clear that sympathetic magic, especially if taken over by the agriculturist, when the actual psychological effect on crops is nil, develops gradually into what we commonly call a form of religion, naturally pantheistic at first. It must always be remembered, however, that with modern undeveloped and backward peoples the reverse may be true, and the particular magic which we find amongst them to-day, may be a degeneration of an earlier form of religion.

What has been said about ceremonial burial in a previous chapter must not be

forgotten. Running alongside of the emotion which is expressed in sympathetic magic, was another emotion probably religious, originally connected with a cult of the dead. Evidence of this has been found in France, even earlier than the coming of the artistic Aurignacian race. When sympathetic magic has developed into religion these two emotions tend partly or wholly to coalesce.

There are only two examples in Cave Art, which may conceivably have been made for a purely decorative purpose, and these are at Cap Blanc, and Gorge d'Enfer near Les Eyzies. In both cases we have to deal with rock shelters, not caves. At Cap Blanc there was a frieze of horses and of bison sculptured in high relief on the back wall of the rock shelter. This frieze was partly covered by deposits that contained dateable stone implements, etc. In the Gorge d'Enfer there is a little chamber containing deposits on the roof of which is the bas-relief of a fish. In both these cases pure decoration is a possible motive, but, considering the mass of evidence we have brought forward from the other caves, it is an unlikely one.

Home Art. Turning to the Home Art, it would seem that there are five reasons why

prehistoric Man should have produced this kind of Art. (1) Decoration, (2) Self-expression, (3) Magic, (4) Sketches from Nature for the cave paintings, (5) School practice.

Unlike the case of the Cave Art, it is probable that all these reasons are true in different instances. We are not dealing with temples containing, more or less, a single thought, we are dealing with homes which illustrate all sides of life; it is, therefore, clearly difficult to say for what reason the particular object was made. It may be interesting to examine these various reasons separately.

(1) *Decoration.* We have already noted in a previous chapter that Home Art comprises (*a*) Naturalistic representations, (*b*) Conventional figures derived from naturalistic representations, (*c*) Conventional patterns.

There is no reason to deny any of these to decoration, and it is quite conceivable that many of the decorated bone tools and weapons had no other motive than a purely ornamental one. Who can say that a little ivory statuette from Brassempouy was not for home decoration? In the case of purely geometric Art, decoration would seem a very likely motive.

(2) *Self-expression.* Who is to say that an artist folk (for even if the cave paintings were done by professionals the race must have been an artistic one) took no interest in making sculpture, bone silhouettes, and engravings in their spare time? Indeed, this is what one would expect, and what must have happened. Much of this work was no doubt done on wood and has perished, but some of the examples on bone and stone have survived.

(3) *Magic.* Magic, of which we have spoken so much in connection with the caves, must not be omitted from the home, where the occurrence of engravings, etc., of animals on weapons is rather significant. Were they not to make the weapon more efficacious for its deadly purpose? Out of a naturalistic sketch grew the conventionalised drawing of the animal; are we to see naturalistic symbolism developing into the symbol? Further, at Liveyre, there was found a small flat piece of green schist, a rock rare in the country. It had been carefully collected, a hole pierced so that it could be strung, and the flat sides decorated with engravings of animals, three on one side and one on the other. The three animals are facing different ways, and bear no relation to one another. This does not

argue for pure decoration. It would seem more likely that this strange piece of green rock had been carefully sought for, engraved, and treated as an amulet or talisman.

(4) *Sketches for cave paintings.* It is inconceivable that even the trained artist could go into a deep cave with indifferent illumination and straightway make a faultless engraving or painting of an animal without preliminary study. Even our own artists of to-day often make a small sketch of their subject before they begin on the large canvas. The paintings and engravings in the caves represent animals in many attitudes, and are not all drawn in the same way according to any fixed rule. It is, therefore, quite possible that many of the fragments of bone and stone exhibiting well-made engravings of animals, may easily have been sketches from Nature to be used afterwards for big drawings in the caves. For example, there was found in the diggings of Hornos de la Peña a fragment of bone on which were engraved the hind-quarters of a horse (the rest of the drawing being lost), which are the exact replica of those of a horse engraved on the walls of that cave.

(5) *School practice.* It is also inconceivable that any artist could have learnt to draw

so well by the light of Nature. There must have been definite instruction in method and technique; not only is this certain from fundamental considerations, but the fact that changes of phase occur about the same date over wide areas, argues undeniably for the existence of a professional artist — medicine man — caste, members of which, though widely separated, had intercourse with each other, and were controlled by schools of tradition. We have already seen that various styles existed in each phase and that their significance was merely local; but no other explanation is possible for the widely distributed changes of phase. No doubt the young novice learned his trade in a school, and it is a significant fact that rough fragments of bone and stone, exhibiting poor engravings and scratches, are more numerous in certain places than in others. Finished works of art will be found at one place, and quantities of these inferior fragments at another. Were these the "slates" of the novice artist working at school? Whether this was the case or not, we may be sure that many of the poor engravings found on irregular fragments were the work of men practising for their profession.

In cases where the piece of bone shows merely a certain number of vertical scratches some form of message or counting of the heads of game may have been intended; this, however, is uncertain.

Eastern Spanish style. The reason why rock shelters in the eastern Spanish peninsula were decorated with pictures of animals and hunting scenes, is still very obscure. At first sight, one would conclude that simple decoration might well have been the motive; further research, however, would indicate that there are no "homes" under the decorated rock shelters. Excavations reveal no stratified deposits containing stone and bone implements, and, above all, no remains of food. A few stone implements are sometimes dug up, but they are very rare, and nowhere numerous enough to indicate a definite home circle, but the *tout ensemble* is very different from that of the northern group. Two main differences will have been noted by the reader. Firstly, that the paintings depict a number of human beings, the women fully dressed, and the men having sometimes queer head dresses, probably of plumes (Alpéra). Secondly, that definite scenes are often depicted. The hunter and the bison at Cogul, the hunter and the

chamois at Tortosilla, the animals driven on to a line of archers at Barranco de Valtorta, the collecting of honey at Bicorps. It should also be noted that, though certain scene groups are found, the main mass of the paintings bear little or no relation to each other.

The localities where the paintings occur seem to have been of some importance, for we find the Neolithic and Eneolithic people at a much later date often utilising the same old rock shelters, and painting their highly conventionalised signs over the older naturalistic pictures. Certainly in Palæolithic times the art had some definite importance, for notice the care with which a bull painted in light red at Cantos de la Visera has been changed, at a slightly later date, to a poorly done stag painted in chocolate.

Further we cannot get at present, but the indications are that these places were probably of a rather sacred character, and the paintings were probably associated with some sort of ritual. It would seem likely that the rites were primarily connected with hunting, but were of a more elaborate kind, indicating more advanced and complex thought than was the case in that of the northern group.

Most of the suppositions in this chapter

are probably not very far from the truth, and on many points we have the analogy of modern primitive peoples to help us; a certain amount is, however, of the nature of hypothesis, which further work and more discoveries will no doubt demonstrate fully or modify.

We are left with the idea of a people who, loving Art, brought it into daily life in their homes, of a society who, honouring Art, recognised a class of artist priests; and of a race who, feeling the force of talent, tried by it to quell their natural fears and to draw to themselves that success, which takes different forms in different ages, but is the Golden Dream of all Mankind.

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